



United States
Department of
Agriculture

Forest
Service

Medicine Bow –
Routt National
Forests and
Thunder Basin
National
Grassland

Laramie,
Wyoming

April 2019



FINAL SUPPLEMENTAL AQUATICS REPORT

Medicine Bow LaVA Project

**Medicine Bow National Forest,
Albany and Carbon Counties, Wyoming**

/s/ William Baer

April 1, 2019

William Baer, North Zone Fisheries Biologist

Date

**Medicine Bow National Forest
Brush Creek – Hayden Ranger District
2171 N. Highway 130**

307-326-2538, wbaer@fs.fed.us

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

TABLE OF CONTENTS

Summary	4
Regulatory Framework.....	5
Federal Laws and Regulations	5
Forest Service Direction.....	6
Forest Plan Direction	6
Analysis Methodology.....	7
Proposal Description.....	7
Project Area Description	8
Affected Environment	12
Existing Condition	12
Desired Condition	20
Environmental Consequences	21
Project Design Features.....	21
Alternative 1 - No Action	22
Direct and Indirect Effects– No action	22
Cumulative Effects – No action	23
Alternative 2 – Modified Proposed Action	25
Direct Effects – Modified Proposed Action	25
Indirect Effects – Modified Proposed Action	27
Cumulative Effects – Modified Proposed Action	31
Compliance with Regulatory Direction.....	31
Forest Plan Consistency.....	31
Consistency with Other Laws and Regulations.....	31

Irreversible and Irretrievable Commitments of Resources	31
Biological Assessment	32
Introduction.....	32
Consultation to Date.....	32
Effects to Federally Listed and Proposed Fish and Amphibian Species.....	34
Responsibility for a Revised Biological Assessment	34
Biological Evaluation	35
Introduction.....	35
Responsibility for a Revised Biological Evaluation	36
Sensitive Species Information	37
Boreal Toad	37
Northern Leopard Frog.....	38
Wood Frog.....	38
Colorado Cutthroat Trout.....	41
Mountain Sucker	43
Determination of Effects	44
No Action Alternative	44
Modified Proposed Action Alternative.....	44
Management Indicator species.....	44
Introduction.....	44
Status of MIS “Common Trout”	46
Summary Findings for Common Trout MIS	46
No Action Alternative	46
Modified Proposed Action Alternative.....	46
References.....	52
Appendix A- Accounting Units	56

LIST OF TABLES

Table 1. Listed Fish and Amphibian Species that May Be Affected by the LaVA Project.....	33
Table 2. Forest Service Region 2 Sensitive Species.	36
Table 3. Colorado River Cutthroat Trout Population Streams.....	42
Table 4. Colorado River Cutthroat Trout Conservation Populations per Accounting Unit.	56
Table 5. Comparison of Alternative Effects on Watersheds per Accounting Unit.	56

LIST OF FIGURES

Figure 1. LaVA Project Area.....	8
Figure 2. Landscape Vegetation Analysis Project Area River Basins.	9
Figure 3. Accounting Units Map.....	10
Figure 4. Treatment Opportunity Area Map.	11
Figure 5. Colorado River Trout Conservation Populations within the Green River Basin.	13
Figure 6. Watershed Condition Indicators within the Watershed Condition Framework.	15
Figure 7. Overall Watershed Classification.	16
Figure 8. Aquatic Physical Rankings of 6th Level Watersheds.	18
Figure 9. Aquatic Biological Rankings of 6th Level Watersheds.	19
Figure 10. Accounting Units with Impaired conditions for Open Road Density and Proximity to Water.	30
Figure 11. Brook Trout Status in the Snowy Range (Allison 2006).....	47
Figure 12. Brown Trout Status in the Snowy Range (Allison 2006).....	48
Figure 13. Rainbow Trout Status in the Snowy Range (Allison 2006).	49
Figure 14. Brook Trout Status in the Sierra Madre Range (Anderson 2011).	50
Figure 15. Brown Trout Status in the Sierra Madre Range (Anderson 2011).	50
Figure 16. Rainbow Trout Status in the Sierra Madre Range (Anderson 2011).....	51

SUMMARY

The LaVA project area includes portions of two major drainage basins; the Green River Basin west of the Continental Divide and the Platte River Basin east of the Divide. The analysis area for aquatic resources is spatially bounded within the two basins and temporally from the early-1900's to 5 years beyond project completion (approximately 2033). The rationale for this bounded in space and time is that the existing condition has been influenced through anthropogenic impacts prior to establishment of the National Forest in 1902, particularly introduction of non-native fish species, hard rock mining, and water diversions.

Aquatic resources have been influenced by anthropogenic activities such as water diversions, mining, grazing, recreation, timber harvest and other multiple uses. These activities have reduced stream flows, introduced sediment into stream channels, reduced riparian vegetation, and altered channel morphology.

Nonnative trout have been introduced into Forest streams and have become abundant and widely distributed. Although these introductions have established a strong and popular fisheries within and outside the project area, they have affected the integrity of native fish, macroinvertebrate and amphibian communities.

The project area supports five Region 2 aquatic sensitive species. These include the boreal toad, wood frog, northern leopard frog, mountain sucker and the Colorado River cutthroat trout. All species are listed by the Wyoming Game and Fish Department as "Species of Greatest Conservation Need" (SGCN). There are 3 known boreal toad breeding sites within the project area, all within the Snowy Range Mountains of the Platte River Basin. There are no known active breeding sites within the Sierra Madre Range. The two sensitive fish species are located within the Green River Basin.

Management Indicator Species (MIS) for the Medicine Bow Forest include "common trout", which consists of rainbow, brown and brook trout. MIS are chosen as species representative of certain habitat conditions important to a variety of other species.

Watershed condition assessments, as identified in the Watershed Condition Framework, were used to provide a relative indication of the physical, chemical and biotic conditions of sixth-level watersheds within the project area. Twelve core national watershed condition indicators comprised of attributes (related to watershed processes) were assessed to classify watershed conditions. The indicators are grouped according to four major process categories. This report focuses on the Aquatic Physical and Aquatic Biological process categories, and to a lesser extent on the attributes of "Open Road Density" and "Proximity to Water" (roads) within the Terrestrial Physical process category. The watershed condition classifications and selected attributes were used as analysis indicators to measure potential effects of the proposed action on the aquatic resources.

Based on analysis of current conditions and predicted impacts resulting from selection of the modified proposed action, environmental effects are expected to have a moderate degree of impact on aquatic resources. The degree of impact is attributable to the relative size of treatment areas or disturbance planned for a given watershed in conjunction with past, present, and reasonably foreseeable actions. Short-term impacts from 600 miles of temporary road construction include an increase in “Open Road Density” and “Proximity to Water”. This impact will continue until the temporary roads are decommissioned.

Environmental effects on sensitive species may result in impacts to boreal toad, northern leopard frog, wood frog, mountain sucker, and Colorado River cutthroat trout individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Environmental effects on aquatic Management Indicator Species (MIS) is expected to have a moderate degree of impact. The degree of impact would be of relatively temporary (i.e. 10-15 years) duration.

Applicable Forest Plan standards and Best Management Practices along with project-specific design criteria should reduce impacts to stream habitat, and riparian and wetland areas where MIS and R2 sensitive species may occur.

The modified proposed action can be consistent with aquatic resource direction in the Forest Plan and meet the intent of the Endangered Species Act. The proposed action is expected to be consistent with the National Forest Management Act by protecting sensitive species habitats from adverse modification or destruction, as well as protecting individual organisms from harm or harassment.

REGULATORY FRAMEWORK

The purpose of this biological evaluation is to analyze and determine the likely effects of the alternatives on federally listed species (endangered, threatened, and proposed) and Forest Service sensitive species (FSM 2670.31-2670.32).

Federal Laws and Regulations

This Biological Evaluation (BE) conforms to legal requirements set forth under section 7 of the Endangered Species Act (ESA) (19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14). Section 7(a) (1) of the ESA requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a) (2) requires that federal agencies ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of federally-listed species, or destroy or adversely modify designated critical habitat.

Forest Service Direction

Forest Service policy requires that a review of programs and activities, through a biological evaluation (BE), be conducted to determine their potential effect on threatened and endangered species, species proposed for listing, and sensitive species (FSM 2670.3). Under the ESA, a Biological Assessment (BA) must be prepared for federal actions that are “major construction activities” to evaluate the potential effects of the proposal on listed or proposed species. The contents of the BA are at the discretion of the federal agency, and will depend on the nature of the federal action (50 CFR 402.12(f)). A BE may be used to satisfy the ESA requirement to prepare a BA. Preparation of a BE as part of the NEPA process ensures that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process.

The Forest Service policy goal on watershed condition is “to protect National Forest System watersheds by implementing practices designed to maintain or improve watershed conditions, which are the foundation for sustaining ecosystems and the production of renewable natural resources, values and benefits” (FSM 2520). Watershed condition classifications follows direction as identified in FSM 2520.

Forest Plan Direction

The 2003 Revised Medicine Bow National Forest Land and Resource Management Plan identifies standards to protect resources. Specific Water and Aquatic Resource standards include;

4. In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition (FSH 2509.25-2006-2 R2 AMENDMENT).
5. Design and construct all stream crossings and other instream structures to allow passage of flows and sediment, to withstand expected flood flows, and allow free movement of resident aquatic life (FSH 2509.25-2006-2 R2 AMENDMENT).
6. Conduct actions so that stream patterns, geometry, and habitats maintain or improve long-term stream health (FSH 2509.25-2006-2 R2 AMENDMENT).
7. Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function (FSH 2509.25-2006-2 R2 AMENDMENT).
14. Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem including quantity and quality of water [R2 Desk Guide].
15. In watersheds containing aquatic, wetland or riparian dependent TES species, allow activities and uses within 300 feet or the top of the inner gorge, (whichever is greater), of perennial and intermittent streams, wetlands and lakes (over ¼ acre) only if onsite analysis shows that long-term hydrologic and riparian function, channel stability, riparian and stream habitat will be maintained or improved [R2 Desk Guide].

Specific Threatened, Endangered, and Sensitive Species standard;

11. Allow no loss or degradation of known or historic habitat for the boreal toad, wood frog, or northern leopard frog [Medicine Bow NF].

ANALYSIS METHODOLOGY

Sources of information used for this analysis included consulting the 2003 Revised Medicine Bow National Forest Land and Management Plan goals, objectives, strategies, standards and guidelines; 2003 Forest Plan EIS, 2003 Forest Plan EIS Appendix I, Forest Service Watershed Condition Framework, GIS geospatial datasets, Forest/district files, species assessment reports, information from the U.S. Fish and Wildlife Service, Wyoming Game and Fish Department, and internet searches for relevant literature review of specific reports and documents.

In 2011, the Forest conducted a watershed condition classification assessment of all sixth-level watersheds on the Forest. The 2011 assessment was based on direction in the Watershed Condition Framework (USDA Forest Service 2011a) and the Watershed Condition Classification Technical Guide (USDA Forest Service 2011b). Twelve core national watershed condition indicators comprised of attributes (related to watershed processes) were assessed to classify watershed conditions. The indicators are grouped according to four major process categories; Aquatic Physical, Aquatic Biological, Terrestrial Physical, and Terrestrial Biological. This report focuses on the Aquatic Physical and Aquatic Biological process categories, and to a lesser extent on the attributes of “Open Road Density” and “Proximity to Water” (roads) within the Terrestrial Physical process category.

The watershed condition classification and selected attributes, as identified in the Watershed Condition Framework, were used as analysis indicators to measure potential effects of the modified proposed action on the aquatic resources. Although the analysis is conducted at the sixth-level watershed, the effects analysis is conducted at the Accounting Unit level per Forest Supervisor’s direction. Accounting units are much larger than the sixth-level watersheds and do not necessarily correlate to sixth-level watershed boundaries. Appendix A displays the environmental effects of the propose action per Accounting Units.

PROPOSAL DESCRIPTION

The Forest Service proposes to conduct vegetation management activities on National Forest System (NFS) lands, including inventoried roadless areas, within the Sierra Madre and Snowy Range mountain ranges of the Medicine Bow National Forest. The Notice of Intent for the Landscape Vegetation Analysis (LaVA) EIS described vegetation management activities, including prescribed fire, mechanical, and hand treatment methods, which could be applied to 150,000 – 360,000 acres. Objectives of treatments are to protect, restore and enhance forest ecosystem components; reduce wildfire risk to communities and municipal water supplies; supply forest products to local industries; and improve, protect, and restore wildlife habitat.

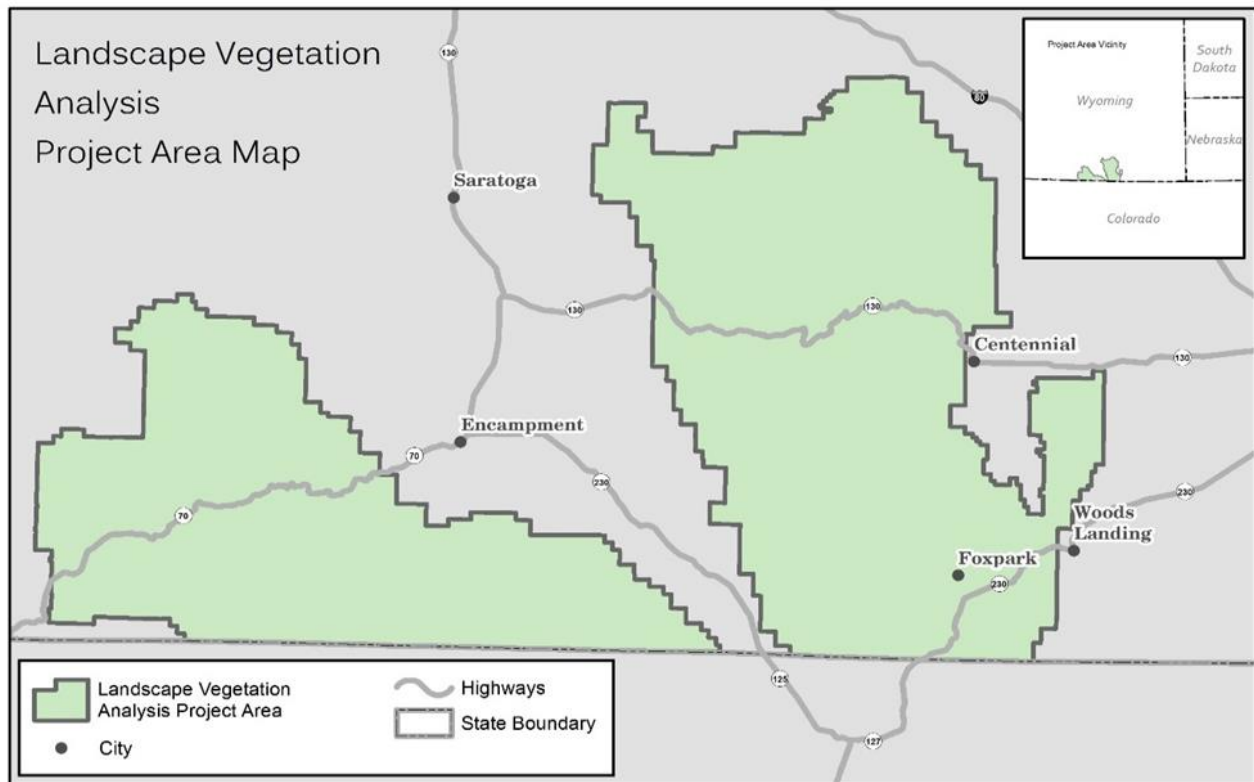


Figure 1. LaVA Project Area.

PROJECT AREA DESCRIPTION

The project area includes portions of two major drainage basins; the Green River Basin west of the Continental Divide and the Platte River Basin east of the Divide. The Green River Basin is the upper portion of the Colorado River system and drains the western section of the project area. The Platte River is the upper portion of the Missouri River Subbasin and drains the eastern section of the project area.

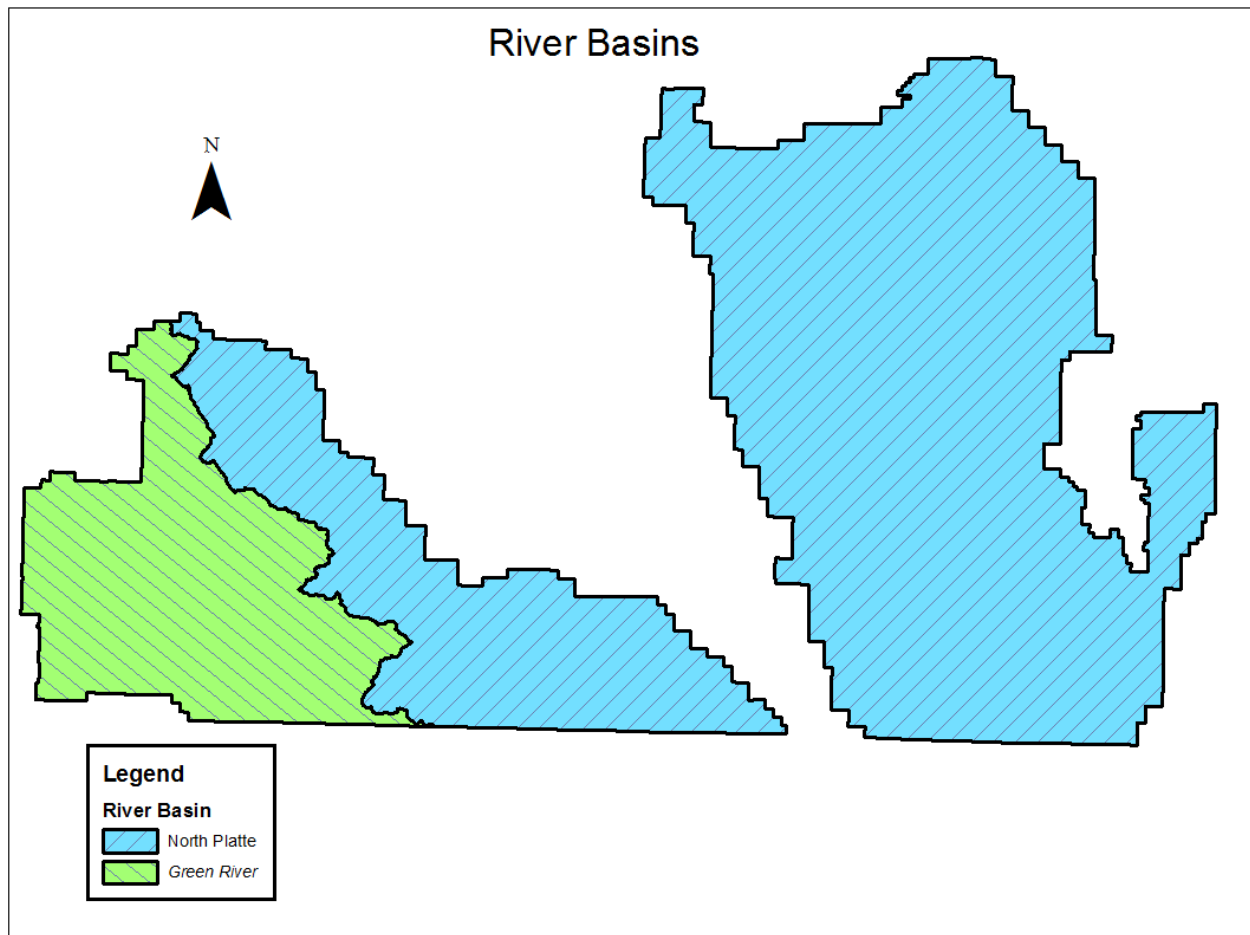


Figure 2. Landscape Vegetation Analysis Project Area River Basins.

The LaVA project area encompasses the Sierra Madre Mountain Range to the west and the Snowy Range of the Medicine Bow Mountains to the east. The North Platte River, which flows north, dissects the mountain ranges. The Sierra Madre Range is bisected by the Continental Divide.

The 2003 Revised Medicine Bow Land and Resource Management Plan (Forest Plan) describes the physical environment of the Forest by geographic areas, which are an aggregation of watersheds. The LaVA project area encompasses 20 geographic areas; seven areas in the Sierra Madre Range and 13 areas in the Snowy Range (USDA Forest Service 2003a). See Chapter 3 of the Forest Plan for a complete description of the physical environment of the LaVA project or the July 2017 Medicine Bow Landscape Vegetation Analysis Scoping Document - Amended.

The project area is divided into 14 Accounting Units for effects analysis. These units however do not necessarily correlate to the sixth-level watershed boundaries.

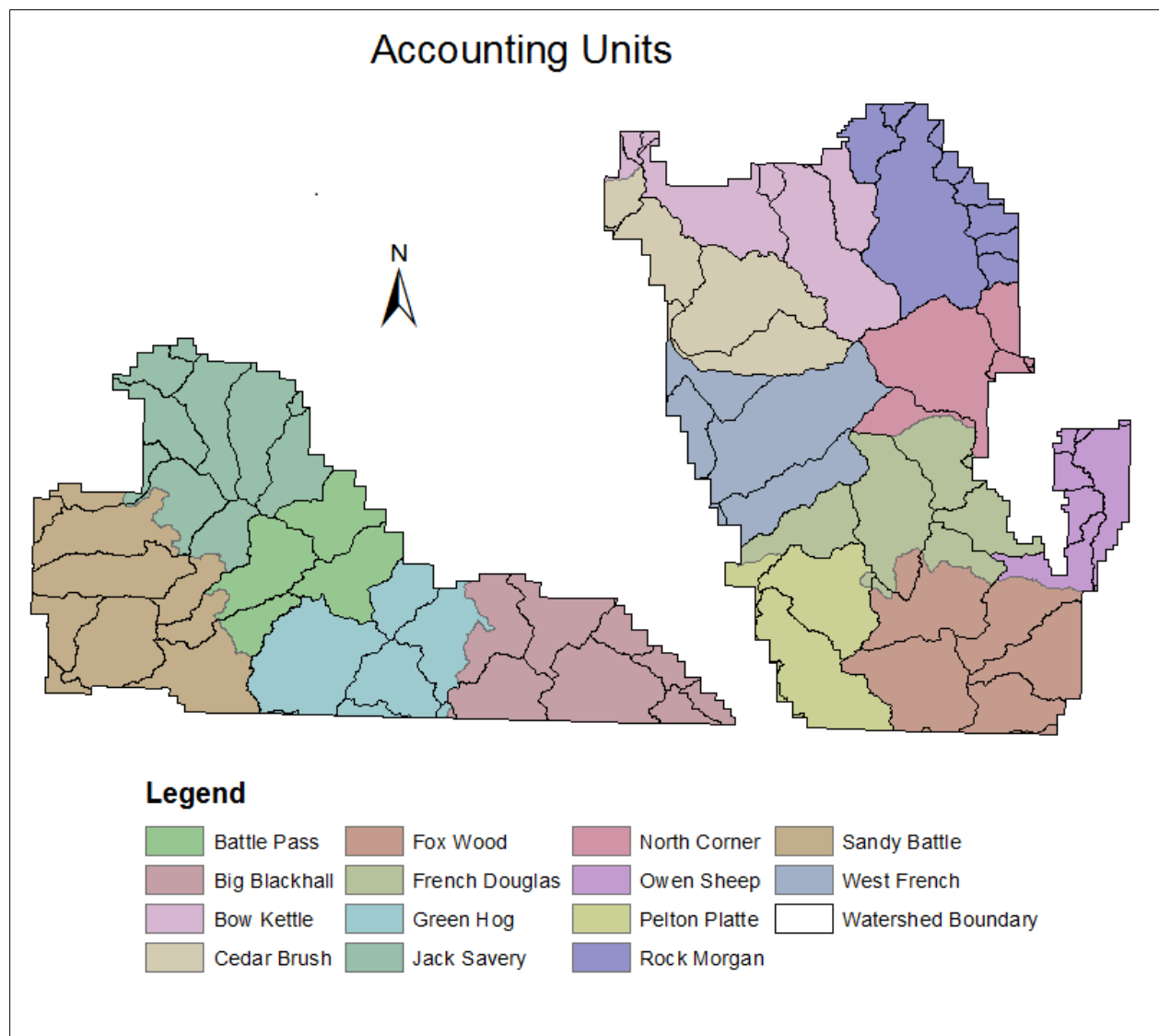


Figure 3. Accounting Units Map.

Management activity opportunity areas were identified within the project area. The map below displays activity types by treatment opportunity areas.

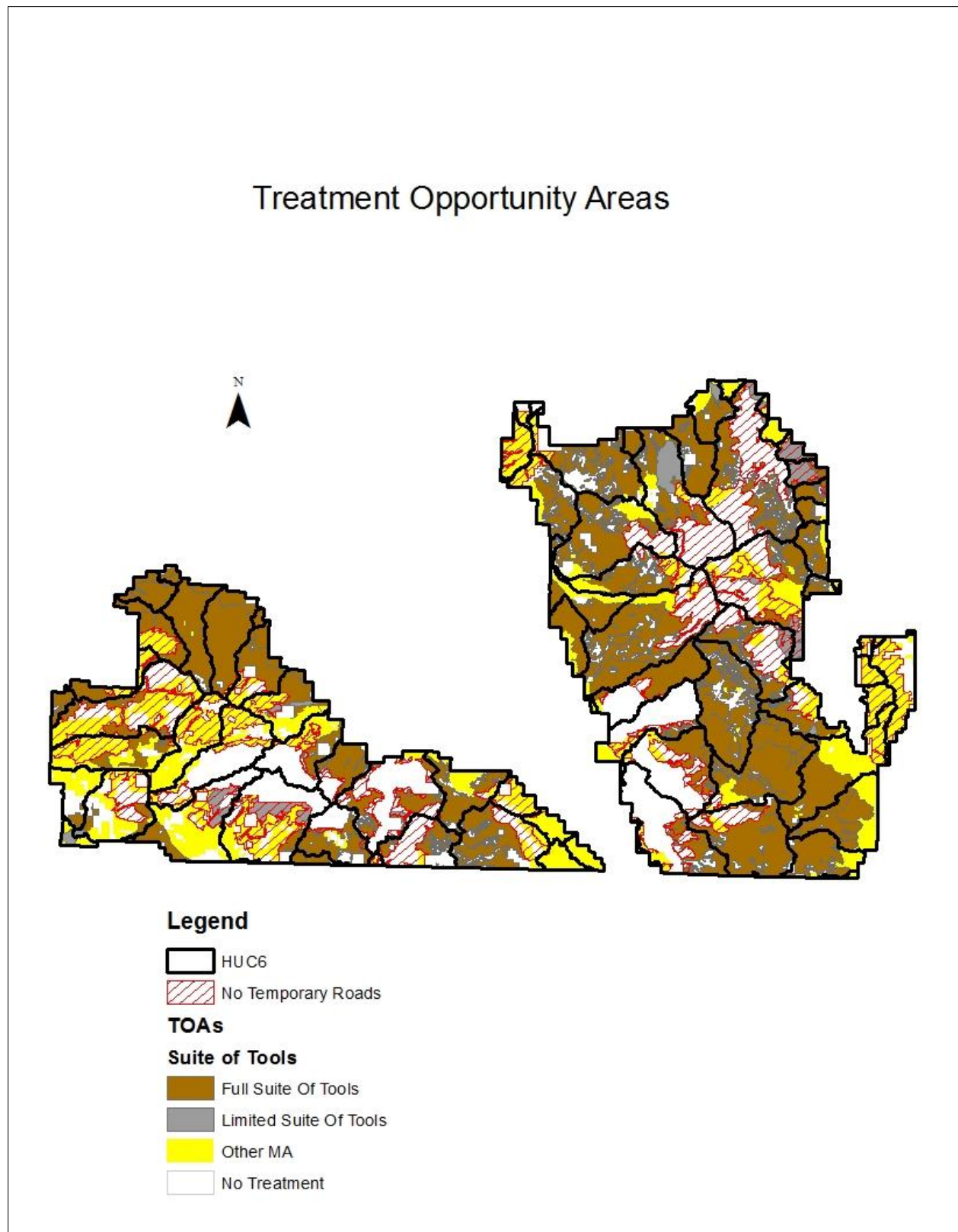


Figure 4. Treatment Opportunity Area Map.

AFFECTED ENVIRONMENT

Existing Condition

There are a variety of surface water resources across the Medicine Bow Landscape Vegetation Analysis (LaVA) project area. Surface water originating in the project area contributes to flows in both the Platte and Green River basins. There are approximately 1,600 miles of perennial stream channels within the project area, including the North Platte, Encampment and Little Snake rivers. Rob Roy Reservoir (640 acres) and Hog Park Reservoir (520 acres) are the two largest water bodies within the project area; there are also hundreds of smaller lakes and ponds, along with several smaller reservoirs.

The Platte River Basin supports a variety of native fish species. These include longnose dace, longnose sucker, creek chub and white sucker. Trout are non-native to the North Platte River Basin, however, they have been widely stocked by the Wyoming Game and Fish Department and others (Wyoming Game and Fish Department 2010). As a result, some of the most prized large river trout fisheries in the State is located on the mainstem North Platte River above the town of Saratoga (Wyoming Game and Fish Department 2010). Trout also provide a popular fisheries in lakes and beaver impoundments that historically did not support game fish. According to the Wyoming Game and Fish Department, most streams on the Forest are classified as supporting 50 to 300 pounds of game fish per mile. The North Platte River is a “Blue Ribbon” fisheries and supports 600 pounds (or more) of game fish per mile. Fishing on the Forest generates approximately two million dollars annually (USDA Forest Service 2017).

The Green River Basin supports native fish species including the Colorado River cutthroat trout, mountain whitefish, mountain sucker, creek chub, roundtail chub, flannelmouth sucker, speckled dace, and mottled sculpin. Non-native fish include brook, brown and rainbow trout.

The roundtail chub, flannelmouth sucker and the Colorado River cutthroat trout are identified by the Wyoming Game and Fish Department as “Species of Greatest Conservation Need” (SGCN). The Department has categorized the flannelmouth sucker and roundtail chub as Tier 1 species. Tier 1 species are physically isolated and/or exist at extremely low densities throughout their range, and habitat conditions are declining. The Colorado River cutthroat trout is categorized as a Tier 2 species. Tier 2 species are physically isolated and/or exist at extremely low densities throughout their range, and habitat conditions appear to be stable. The flannelmouth sucker, roundtail chub, Colorado River cutthroat trout and the mountain sucker are Forest Service, Region 2 sensitive species. The LaVA project area supports populations of Colorado River cutthroat trout and mountain sucker.

The Colorado River cutthroat trout (CRCT) currently occupies approximately 30 percent of its historic habitat within the Little Snake River drainage (Hirsch et al 2013). The LaVA project area supports “conservation populations” of CRCT. Figure 5 below displays the streams which support CRCT conservation populations.

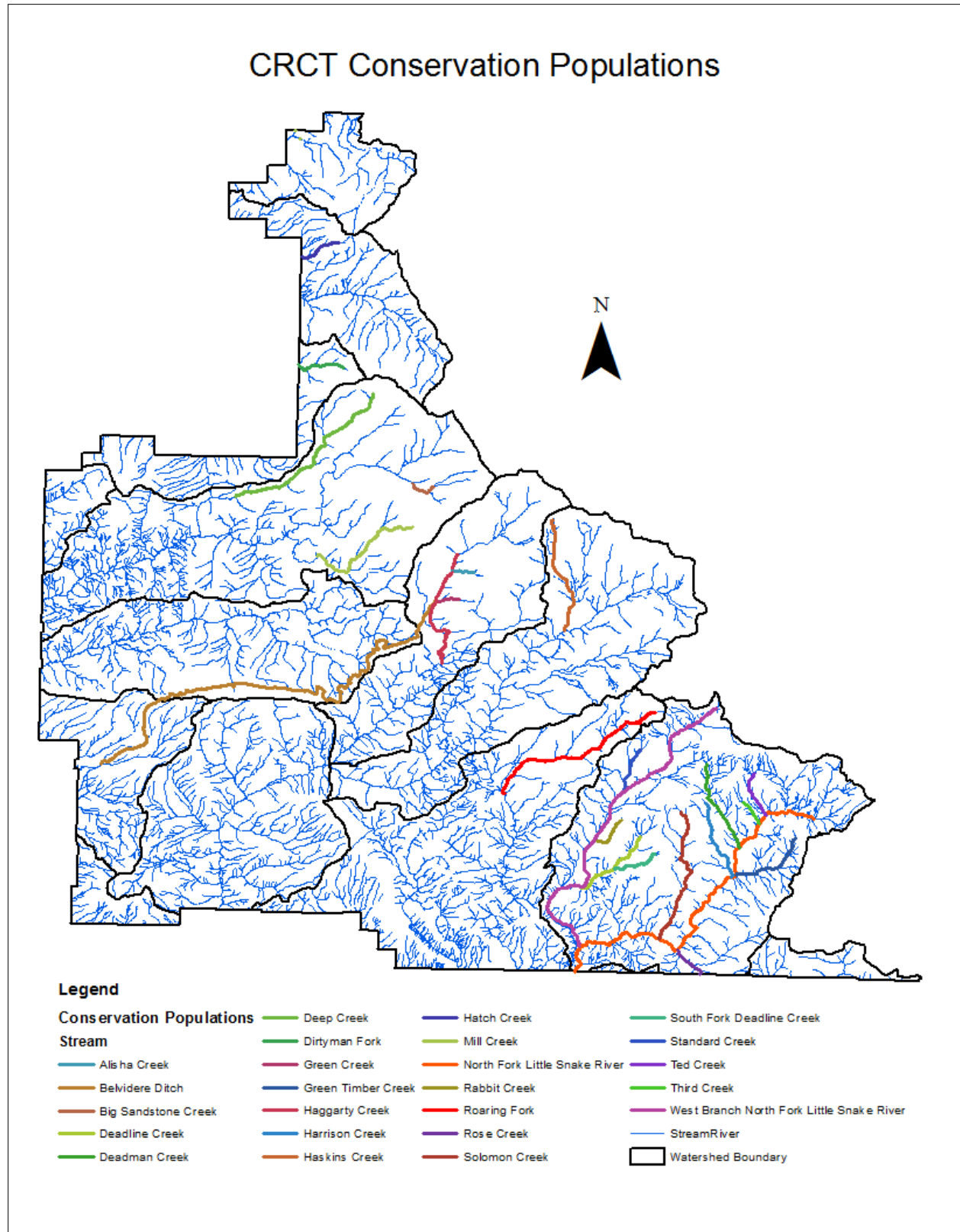


Figure 5. Colorado River Trout Conservation Populations within the Green River Basin.

The mountain sucker is only found on the west side of the Continental Divide and in low gradient streams. Populations are known to exist in Big Sandstone Creek and the West Fork of Battle Creek. However, the mountain sucker is also suspected to be in other streams within the LaVA project area.

Wetlands, riparian areas and floodplains exist throughout the Medicine Bow Forest and provide a range of habitats for a variety of amphibian species, particularly frogs and the boreal toad. There are only 3 known boreal toad breeding sites on the Forest, of which are all located in the Snowy Range. These sites include Ryan Park (Brush Creek watershed), South Mullen Bog / South Mullen Meadow (South Mullen watershed), and Fall Creek (Little Laramie River – Middle Fork Little Laramie River watershed). There are no known active breeding sites within the Sierra Madre Range.

The most common frog found throughout the Forest is the boreal chorus frog. The wood frog is present on the Forest only in the Medicine Bow Range (USDA Forest Service 2003b). The Northern leopard frog is present but not common. The boreal toad, wood frog and Northern leopard frog are Forest Service, Region 2 sensitive species; and are also identified by the Wyoming Game and Fish Department as “Species of Greatest Conservation Need”.

The LaVA project area experienced a mountain pine beetle infestation from 2000 - 2013, as has the western United States and Canada (Hart et al. 2015). The epidemic resulted in mass die-offs of lodgepole pine stands. Effects of the epidemic as it relates to aquatic resources and watershed conditions is not fully understood but there are numerous research efforts underway throughout the west.

The existing conditions of water resources in the project area can be broadly characterized in terms of both water quality and watershed conditions. Most surface waters in the project area are believed to meet all designated water quality uses, but due to the sampling requirements only a small subset of the waters have comprehensive data to support this conclusion. Bear Creek in the Snowy Range, and Haggerty and West Fork Battle creeks in the Sierra Madre Range have been identified with impaired water quality (WYDEQ 2016).

Watershed assessments have been conducted on the Forest since revision of the Forest Plan in 2003. These assessments have been used for broad scale application for the planning of forest management activities. The most recent assessments (2009-2011) followed direction in the Forest Service Manual for watershed classification (USDA Forest Service 2004). Watershed condition classes provide a relative indication of the physical, chemical and biotic conditions of watersheds.

- Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Functioning Properly).
- Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Functioning at Risk).
- Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition (Impaired Function).

In 2009, a watershed condition assessment was conducted on six-level watersheds for both the Medicine Bow and Routt National Forests (Schnackenberg et al. 2010). In 2011, the Forest conducted another watershed assessment based on direction in the Watershed Condition Framework (USDA, Forest Service 2011a) and the Watershed Condition Classification Technical Guide (USDA Forest Service 2011b). Information from the 2009 assessment was used for the 2011 assessment. Twelve core national watershed condition indicators comprised of attributes (related to watershed processes) were assessed to classify watershed conditions. The indicators are grouped according to four major process categories, see Figure 6. For a complete explanation of the condition rating rule set for the attributes, see the Watershed Condition Classification Technical Guide (USDA Forest Service 2011b).

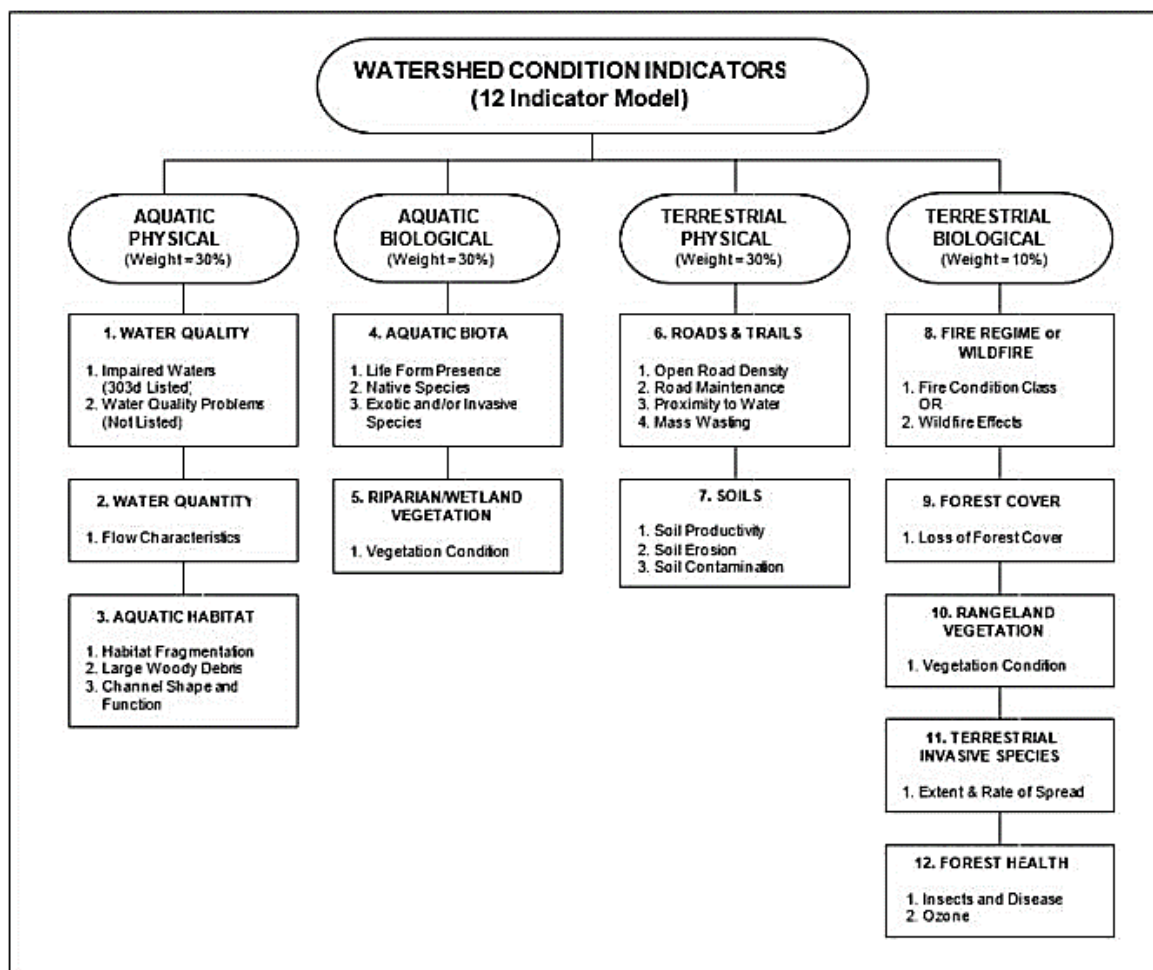


Figure 6. Watershed Condition Indicators within the Watershed Condition Framework.

All watersheds within the project area, except Upper Battle Creek, are Class 2 watersheds. Upper Battle Creek is a Class 1 watershed. There were no Class 3 watersheds identified in the 2011 assessment. Overall, watershed conditions for the majority of watersheds in the project area have been changed from their natural potential condition to a moderate degree in terms of physical, biotic and/or chemical conditions. Figure 7 below displays the overall watershed condition class within the project area.

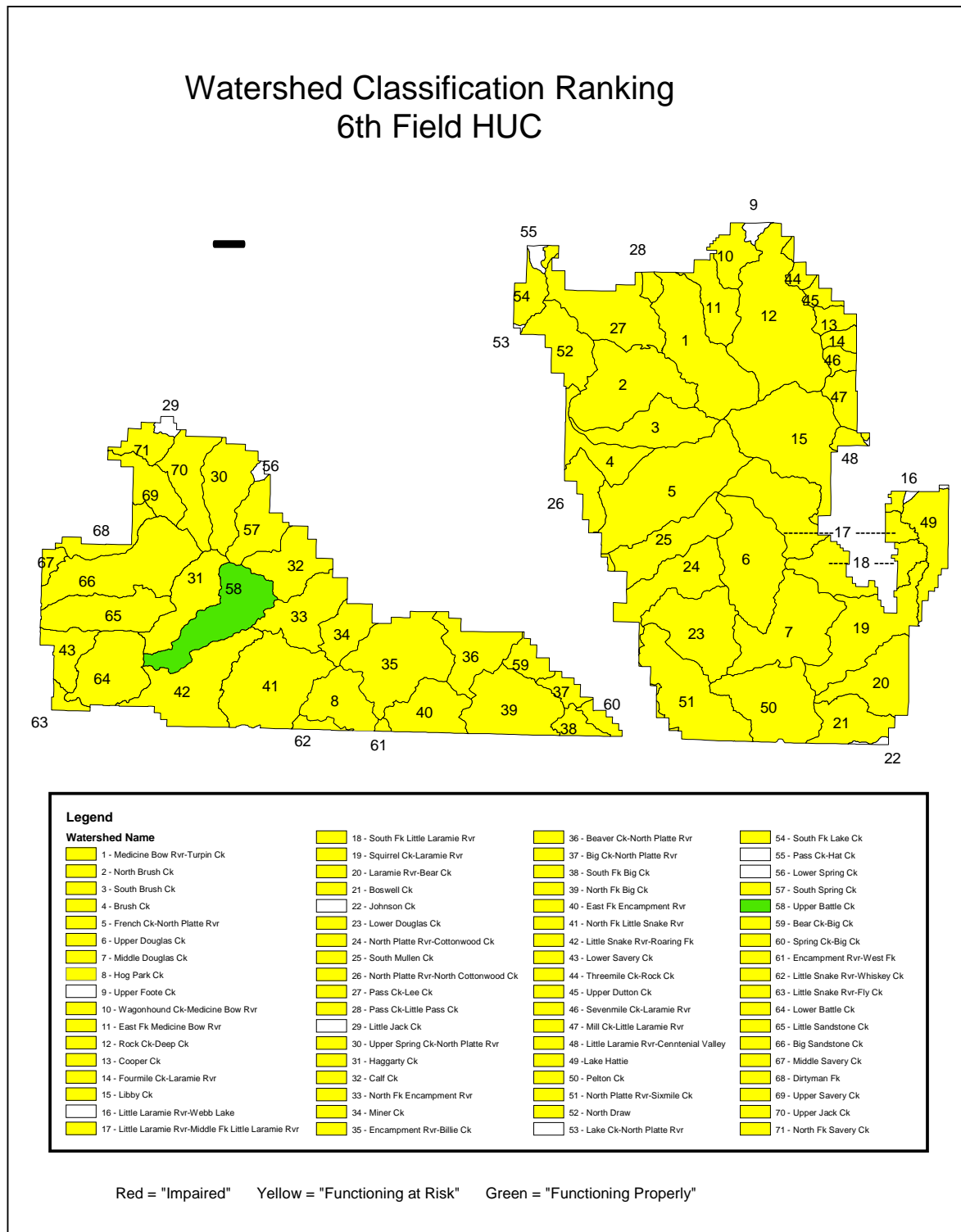


Figure 7. Overall Watershed Classification.

This report focuses on the Aquatic Physical and Aquatic Biological process groups, and to a lesser extent on the attributes of “Open Road Density” and “Proximity to Water” (roads) within the Terrestrial Physical process group. “Mass Wasting” was also considered but it was determined not to be an issue in the watershed condition assessment (on file with the Forest Service). The maps (Figures 8 and 9) below display the Aquatic Physical and Aquatic Biological rankings per watershed, which were used in the overall watershed classification as displayed in Figure 7 above. Watersheds with “Impaired” Aquatic Physical processes are due to decreased water quantity and habitat quality. In some watersheds, the natural flow regime has been altered by diversions and reservoirs that affect mainstem stream flows.

Aquatic habitats have been affected by roads, historic tie drives and localized grazing (USDA Forest Service 2011c). Roads at stream crossings greatly influence the amount of fine substrates and embeddedness in streams (Eaglin 1993). Also, the amount of sedimentation to a stream is dependent upon the proximity of the road to the channel, amount of cut and fill slopes, soil types, and relative slope. Culvert installation at stream crossings have contributed to habitat fragmentation by blocking aquatic organism passage (Anderson 2010).

Historic tie drives within the Platte River Basin have altered large woody debris (LWD) recruitment and in-channel LWD, along with channel shape and function (Young et al. 1994). Splash dams were constructed to flush ties downstream, which modified channel morphology. Boulders, woody debris jams and beaver dams were removed to facilitate unimpeded tie drives (Young et al. 1994).

Localized grazing can also affect channel shape and function (USDA Forest Service 2011c). Prior to the establishment of forest reserves in the early 1900s, livestock numbers and grazing practices were essentially uncontrolled (USDA Forest Service 2003c). This caused widespread riparian damage, including changes in stream morphology, water temperatures, and water quality (USDA Forest Service 2003c).

Stream channel function and shape, and riparian/wetland vegetation can be altered through water augmentation. The Cheyenne Board of Public Utility (CBPU) operates two reservoirs which augments flows to the streams below the reservoirs. Hog Park Reservoir, located in the Sierra Madre Range, releases water into Hog Park Creek. Rob Roy Reservoir, located in the Snowy Range, releases water into Douglas Creek. These augmented flows have caused widening of the stream channels and sediment deposition (Purchase 2012). The 2014 Operation and Maintenance Plan identifies minimum instream flows and flushing flows for the operation of the reservoirs. These requirements are to protect the fisheries resource and channel stability (USDA Forest Service 2014).

There are numerous irrigation diversions located throughout the Forest. Diches can reduce stream flows, which degrade fish habitat and act as thermal barriers to fish movement. Fish screens are not required at ditch inlets, thus fish can become entrained in irrigation ditches. Some ditches have evidence of downcutting and xeric riparian vegetation from water augmentation (USDA Forest Service 2011c).

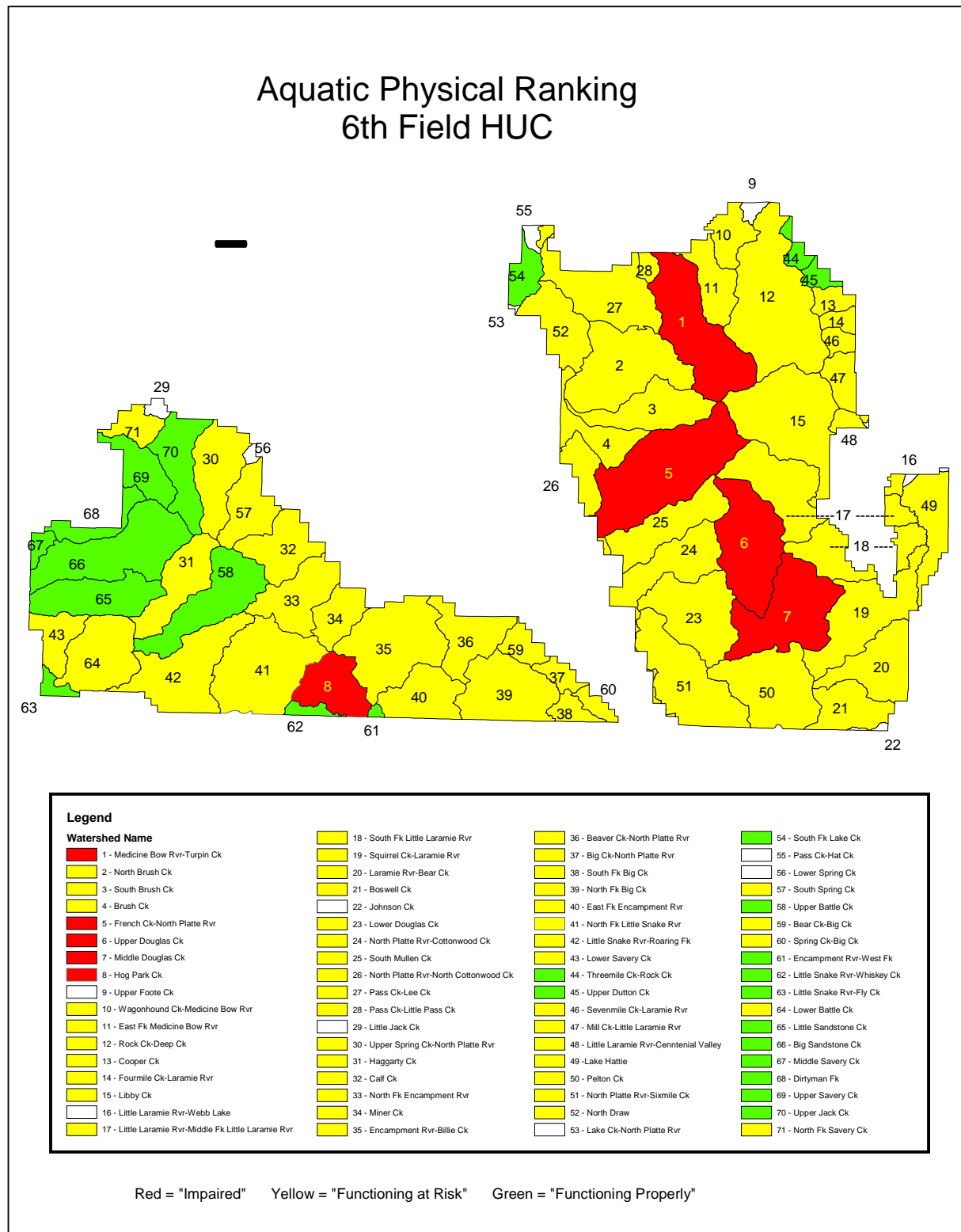


Figure 8. Aquatic Physical Rankings of 6th Level Watersheds.

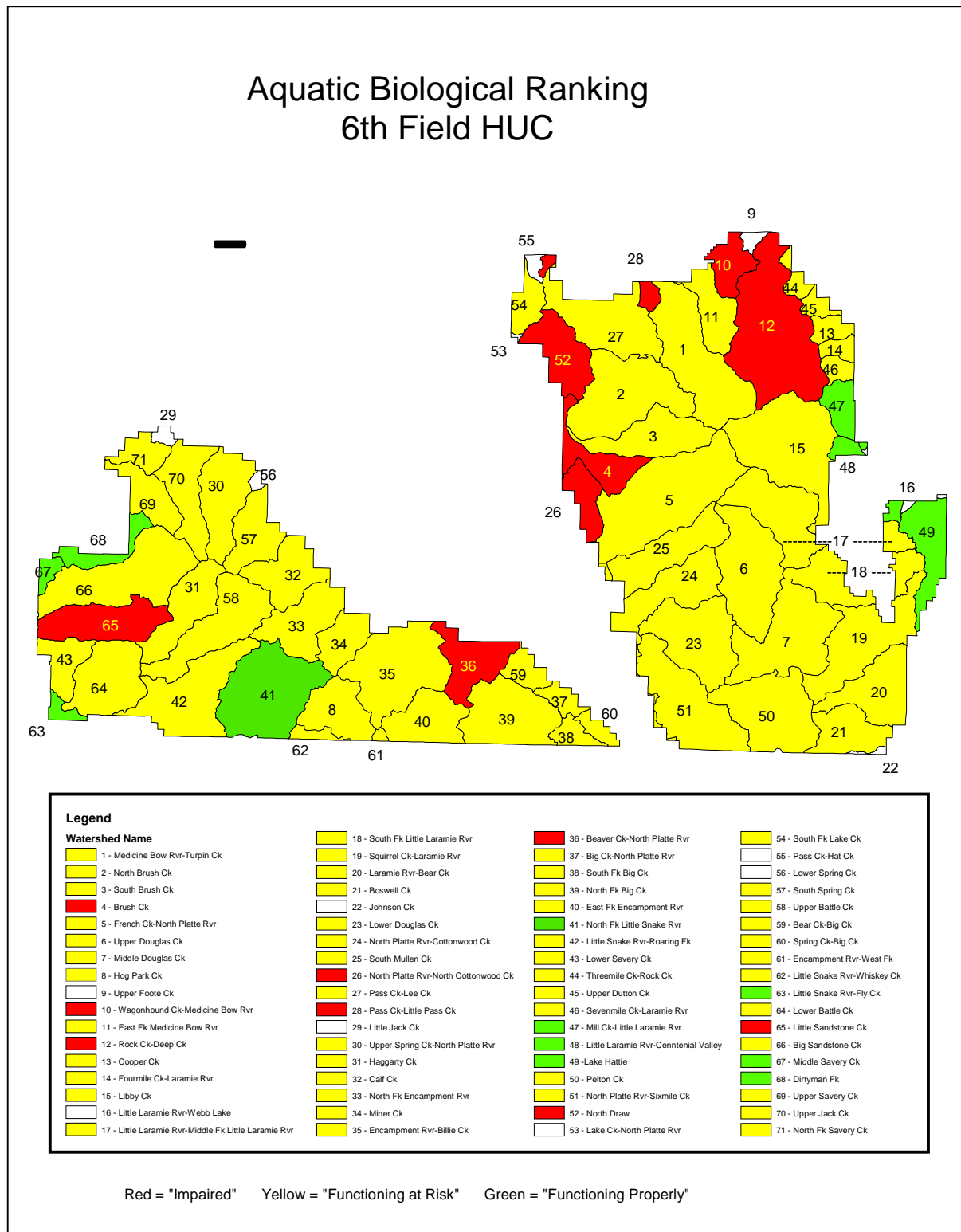


Figure 9. Aquatic Biological Rankings of 6th Level Watersheds.

Watersheds with “Impaired” Aquatic Biological processes are due to a decrease in the aquatic biota and riparian/wetland vegetation. Decreased aquatic biota is a result of stocking non-native trout species throughout the Forest. Decreased riparian/wetland vegetation is a result of localized grazing and water augmentation (USDA Forest Service 2011c).

As part of the Watershed Condition Framework approach, the Forest has identified priority watersheds for restoration. These watersheds include Douglas Creek, East Fork Encampment River, North Fork Little Snake River, Pelton Creek and Turpin Creek. Watershed restoration action plans have been developed for Pelton Creek and the East Fork Encampment River. Action plans are being developed for the remaining watersheds.

In 2008, the Forest began inventorying road culverts that could impede aquatic organism passage (Anderson 2010). Since 2011, a total of 10 culverts have been replaced or removed which improved access to over 35 miles of upstream aquatic habitat. In addition, three water diversion have been modified and three in-channel weirs have been removed. All totaled, approximately 110 miles of stream have improved access for aquatic organism passage.

The watershed assessments did not consider the potential effects from climate change. Climate change has the potential to effect cold water fish populations through increased summer water temperatures, drought, wildfire and winter flooding. Increased water temperatures could also lead to habitat fragmentation as cold water species move into headwater streams where water temperatures are cooler. It is estimated that up to 76% of habitat would be lost in the North Platte drainage for populations of brown, brook and rainbow trout, as a result of warmer summer conditions (Williams et al. 2009). Williams and others also estimated 29% of occupied Colorado River cutthroat trout (CRCT) populations west of the Continental Divide will be at high risk from increased summer temperatures, winter flooding and/or increase wildfires. However, no CRCT watersheds within the project area appear to be at high risk (Hirsch et al. 2013).

Desired Condition

A general summary of aquatic desired conditions as identified in the 2003 Revised Medicine Bow Forest Plan is listed below. For a more complete description see the Forest Plan.

Within 10 years of completion of the Forest Plan;

- Conserve and restore watersheds and populations of native organisms.
- Improve conditions for sensitive species.
- Watersheds conditions are improved on 20% of the 5th level watersheds.
- Riparian and wetland habitat conditions are maintained or improved so that at least 80% of riparian and wetland areas will meet or move toward proper functioning condition.
- Stream flows are improved for at least 10% of the stream segments having in-stream flow concerns.

Within 50 years;

- Critical habitats identified through project implementation are managed to perpetuate habitat conditions needed for TES and non-TES wildlife.
- Native fish habitats and population restoration projects have been implemented.
- Watershed conditions are improved on all of the 5th level watersheds.
- Riparian and wetland habitats are maintained or improved to ensure all are in proper functioning condition.
- Stream flows are improved.

Geographic Area specific desired conditions;

- ❖ Battle Creek
 - Improve water quality in impaired streams (Haggerty Creek and West Fork Battle Creek).
 - Maintain or enhance Colorado River cutthroat trout habitat in tributaries north of Highway 70.
- ❖ North Savery
 - Maintain or enhance Colorado River cutthroat trout habitat.
- ❖ Upper Little Snake River
 - Key Colorado cutthroat trout habitat will be maintained or enhanced.
- ❖ Brush Creek
 - Protect identified boreal toad breeding sites.

ENVIRONMENTAL CONSEQUENCES

Project Design Features

The following design criteria are recommended for the LaVa project.

- Keep heavy equipment out of streams during fish spawning, (March 15 – May 31 for cutthroat and rainbow trout; October 15 –November 30 for brook and brown trout), incubation, and emergence periods.
- Install stream crossings perpendicular to flow as practicable.
- A Forest Service Hydrologist or Fisheries Biologist and Engineer will locate, design and designate any temporary road crossings of perennial streams.
- Avoid direct ignition in riparian and wetland; let the fire to back into these areas.
- Use spill containment equipment if it is necessarily to locate staging and refueling areas within the water influence zones.
- Felled material or other associated debris with potential to block culverts or bridges will be removed from the high water mark.

- In consultation with fisheries staff, develop site-specific design criteria to ensure protection of boreal toad, wood frog, and northern leopard frog habitat and populations.

In addition to the design criteria, the Forest Plan identifies standards (page 1-28 and 1-29) for the protection of aquatic resources (USDA Forest Service 2003a).

Timber sale contracts also provides direction for the protection of resources through contract provisions. Specifically, provisions B6.5 “Streamcourse Protection”, B6.61 “Meadow Protection”, and B6.6 “Wetlands Protection” (USDA Forest Service 2006).

Alternative 1 - No Action

Direct and Indirect Effects– No action

This alternative serves as the baseline for comparison of environmental consequences and is a management option. Ongoing and reasonable foreseeable management actions (i.e. vegetation and fuel treatments) would continue. The Forest 15 year average for timber and fuel treatment projects has been approximately 1,926 acres and 3,017 acres respectively per year. This amount of vegetation management activity could be expected during the next 15 years.

The existing condition of the aquatic resources as described in the Affected Environment section of this document would be maintained. Selection of the No Action alternative does not necessarily mean forest ecosystem components and aquatic habitat would not be protected or restored, or the risk of wildfires will increase.

Some research studies have found that the mountain pine beetle (MPB) epidemic across the west has not increased the risk of fire danger (Hart et al. 2015), nor has there been an increase in occurrences of high-fire severity in southern Wyoming (Kulakowski 2011). Other studies have shown that logging of MPB stands increases fuel surface loads, and in the event of a post-harvest wildfire, has the potential to exacerbate fire behavior (Rhoades et al. 2018). In other areas, while salvage logging removed the forest canopy and thus eliminated the risk of crown fire, surface fires that burned through harvested areas had similar effects to crown fires in uncut areas (Rhoades et al. 2018). In regard to fire effects to amphibians, mortality of amphibians during prescribed and wildland fires is thought to occur rarely and be of relatively minor importance to most populations (Pilliod et al. 2003).

Studies generally agree that snow depth will increase in beetle killed stands, however the magnitude is uncertain (Mikkelsen et al. 2013). Paughn (2011) showed that snow accumulations increased in MBP stands when compared with forested stands; and snowpack depletions generally occurred one week earlier. Effects to water quality, streamflows, and channel morphology are less certain (Mikkelsen et al. 2013). Ewers (et al. 2015), measured no increase in streamflows after the MPB epidemic in southern Wyoming.

Cumulative Effects – No action

This cumulative effects analysis considers past and present actions, and reasonably foreseeable future actions that have and may affect aquatic habitats. The analysis area for aquatic resources is spatially bounded within the Green River Basin and the Platte River Basin, and temporally from the last 15 years (since the implementation of the 2003 Medicine Bow Forest Plan Revision) to approximately 2033 (5 years beyond the proposed LaVA project). The temporal time frame was set by the direction of the Forest Supervisor.

The spatial scale of the LaVA project area is the sixth-level watersheds as described in the affected environment section of this document. The focus of the analysis is on the physical and biological process groups (Figures 8 and 9).

Past Actions

Multiple-use activities have altered aquatic ecosystems in the project area decades before and after establishment of the Medicine Bow Forest Reserve in 1902. Timber harvest, mining, grazing and water diversion, have all impacted aquatic resources within the project area. Timber harvest, mining, grazing, and stocking of non-native trout species had the greatest impact on aquatic resources (USDA Forest Service 2003c).

Timber harvest, predominantly for railroad ties, were floated down streams to collection points along the North Platte, Medicine Bow and Laramie rivers in the North Platte Basin. These tie drives straightened and widened stream channels, reduced habitat complexity, and impacted riparian vegetation (Young 1994). The last tie-drive was in 1940.

Commercial mines, such as the Ferris-Haggerty mine in the Haggerty Creek watershed and the Rambler Mine in the Upper Douglas Creek watershed, are responsible for heavy metal contaminations (WDEQ 2016). Haggerty Creek and West Fork Battle Creek below the Ferris-Haggerty Mine are on the state's 303(d) list for impaired waterbodies because they exceed established criteria to protect aquatic life and coldwater fish uses. Rambler Creek and Bear Creek below the Rambler mine are on the state's 303(d) list for aquatic life other than fish. Over grazing has affected riparian and wetland vegetation.

Water diversions for irrigation purposes began prior to and after 1902. Diversions reduce stream flows which impact habitat, and can act as barriers to fish movement. Ditches can also entrain fish because there is no requirement to screen ditches.

The City of Cheyenne Board of Public Utilities (CBPU) has had a water collection and storage system on the Forest since 1962 (Purchase 2012). Water augmentation is the release of water from Hog Park Reservoir and Rob Roy Reservoir. These unnatural high and low stream flows have widened the channels of Hog Park Creek and Douglas Creek. Water is collect from diversion structures the in Green River Basin and piped over and through the Continental Divide to the Platte River Basin. The diversion structures are located in the North Fork of the Little Snake River, and the North Fork Little Snake River-Roaring Fork sixth-level watersheds. These diversion structures prevent the upstream movement of Colorado River cutthroat trout, which isolates populations.

Non-native trout were introduced into Forest streams probably prior to 1880 (Wyoming statehood), and have become abundant and widely distributed in the Forest and in streams of adjacent lands. Introduction have had an effect on the integrity of native fish, macroinvertebrate and amphibian communities (USDA Forest Service 2003c).

Wildfire activity over the last 15 years (2003 - 2018) averaged 15 fires per year with an average of 4,900 acres burned per year. The last 7 years (2012 – 2018) has seen the greatest increase in fire activity. There has been 17 fires per year with an average of 10,300 acres burned per year over the last 7 years.

Wildfire soil burn severity would likely continue at levels similar to the previous 15 years. Soil burn severity has average seven percent (7%) high, 35% moderate, 45% low, and 13% unburned. High soil burn severity has the greatest potential to cause erosion and increase sedimentation into streams channels which would degrade aquatic habitat.

Present Actions

Timber harvest is an on-going multiple use on and off the Forest that affects aquatic, riparian, and wetland ecosystems. Road construction associated with harvest activities can effect streams and wetlands. Road construction at stream crossings can create passage barriers for fish migrations, reduces large woody debris recruitment and is a chronic source of sedimentation to stream channels.

Mining is now recreational in scope rather than commercial. Recreational suction dredge mining does have an effect on the aquatic ecosystem, particularly in the Upper and Middle Douglas Creek watersheds. Recreational miners undercut streambanks causing sedimentation, and drive through stream channels and wetlands with their vehicles destroying habitat.

Livestock grazing continues as a legal and legitimate use in the Forest, though the magnitude of overgrazing has substantially diminished. Range land management activities are altered when needed to improve range land conditions.

The operation of the trans-basin water conveyance system operated by the CBPU continues. The Forest has coordinated with CBPU to establish minimum flow requires in some streams, and continues to study the effects of water augmentation on channel morphology.

Stocking of non-native fish species continues in mountain lakes in the Snowy Range. Stocking does not occur in rivers or streams. Fishing on the Forest generates approximately two million dollars annually (USDA Forest Service 2017).¹

¹ Email from. Epstein, Jonas K., ORISE Economic Research Fellow, Washington Office.

Future Actions

Reasonable and foreseeable future actions are difficult to predict, although it can be assumed that vegetation management projects will continue. The Forest will continue to implement watershed restoration activities such as the decommission of Forest roads and unauthorized routes, installation of aquatic organism passage structures, and other activities that are identified through the Watershed Restoration Action Plans and other restoration projects. Multiple use activities on the Forest will continue. Watershed Conservation Practices, Best Management Practices, and Forest Plan standards and guidelines prescribe extensive measures to protect aquatic and riparian resources on National Forest Service lands. If all applicable measures are implemented and effective, adverse cumulative effects from any of the activities should be minimized.

Alternative 2 – Modified Proposed Action

The proposed action is to conduct vegetation management activities on the Medicine Bow National Forest, including in Inventory Roadless Areas (IRAs). Vegetation management activities include prescribe fire, mechanical, and hand treatments on 150,000 – 360,000 acres over the next 10 years. Stand initiating or even-age treatment (clear-cuts) methods would not exceed 95,000 acres. Uneven-aged management or intermediate (overstory removal, seed tree cut, shelterwood) treatments would not exceed 165,000 acres. Other vegetation treatments including prescribed fire, mastication, and hand thinning would not exceed 100,000 acres.

No more than 600 miles of temporary road would be constructed and no new permanent or temporary roads would be constructed in IRAs. The proposed treatments are to protect, restore and enhance forest ecosystem components; reduce wildfire risk to communities and municipal water supplies; supply forest products to local industries; and improve, protect, and restore wildlife habitat.

Fire and fuels implementation will occur on a larger scale and scope when compared to the no action alternative. Fire and fuel activities should be effective at mitigating fire threats in treated areas.

Direct Effects – Modified Proposed Action

Timber Harvest

Under the modified proposed action, up to 260,000 acres of forested areas could be commercially harvested. This total may include up to 95,000 acres of stand-initiation/even-aged treatments (i.e. clearcutting) and up to 165 acres of uneven-aged/intermediate treatments (i.e. overstory removal).

Timber harvest along stream channels and riparian areas can directly affect aquatic habitat by reducing large woody debris (LWD) recruitment, and increase water temperature variations (Cross 2002). Heavy equipment operations around wetlands can destroy amphibian habitat or through direct mortality. Log deck landings that are situated on or directly adjacent to perennial or ephemeral ponds could inundate these habitats or pose obstacles to toads traveling among ponds (USDA Forest Service 2003b).

From USDA, Forest Service 2003c: *Timber harvest in or proximate to riparian zones reduces the abundance of streamside vegetation. A reduction in streamside vegetation can increase average annual and average daily stream temperature, reduce overhanging vegetation, and decrease the recruitment of large woody debris in streams.*

Forest Plan standards require vegetative buffers to be established along streams, lakes, and wetlands to maintain or improve long-term stream health and riparian ecosystems. These buffers or water influence zones (WIZ) vary in width from 100 feet to 300 feet or to the top of the inner gorge, dependent upon the existing health of stream and riparian ecosystems. Therefore, the risk of direct effects to a reduction in LWD recruitment and modification of stream temperatures due to harvest activities is low.

The threat however to amphibian habitat and individuals outside the WIZ is less so, in that some amphibian species can travel up to miles between wetlands in search of hibernaculas. During planning and design of individual treatments, biologists will consult with timber staff to develop site-specific design criteria to protect amphibians and their breeding habitats and associated hibernacula to lessen the risk of direct effects to the species (Amphibian and Fisheries Project Design Feature #7).

Other Vegetation Treatments

Up to 100,000 acres of other vegetation treatments (i.e. prescribed fire, hand thinning and mastication) could be treated under the modified proposed action providing that 360,000 acres is not exceeded when combined with timber harvest. Prescribed fire could conceivably impact amphibians and their habitats, particularly boreal toads. However, riparian areas and wetlands tend to have enough vegetation, soil moisture, and relative humidity to withstand total destruction in all but the most devastating fires (USDA Forest Service 2003b). Fire ignition will not occur within the WIZ but would be allowed to back into the buffer. Direct effects from prescribed fire (i.e. abrupt changes in temperature, inputs of ash, nutrient spikes etc.) are not expected to significantly impact fish or amphibian habitats or populations.

Hand thinning may also occur within the WIZ. Thinning activities would disturb potentially occupied amphibian habitat. However, thinning would not be expected to adversely affect or amphibian populations. Hand thinning would not be expected to have direct or indirect effects to aquatic habitat.

Mastication is accomplished with the use of machinery to grind small diameter trees into small chunks which is left on the forest floor as large mulch. Mastication is used to establish fire breaks. This method has the potential to directly affect amphibians by destroying hibernaculas or through direct mortality. Site-specific design criteria will be developed in areas adjacent to breeding habitats and associated hibernaculas (Hydrology and Wet Area Project Design Feature #3).

Mastication will not have an effect on aquatic habitats, in that mastication would not occur within the WIZ per Forest Plan standards, unless the long-term health of the riparian area is maintained or improved. Prior to any encroachment into the WIZ, the area will be reviewed by a fisheries biologist or hydrologist. Specific design criteria will be developed to maintain or improve the long-term health of the riparian area.

Temporary Road Construction

The proposed action could construct up to 600 miles of temporary road to access treatment areas. The final assessment of road needs has not yet been determined. The exact location of temporary roads is currently unknown but there is potential for direct effects to aquatic habitats, and fish and amphibian populations.

Overall, risks of impacts to aquatic, riparian, and wetland ecosystems due to roads tend to increase with new road construction (USDA Forest Service 2003c). Road construction has the potential to directly affect fish populations and their habitat at stream crossings by increasing sedimentation, reducing LWD recruitment, and impeding fish passage. Roads constructed through or parallel to wetlands will impact amphibians and their habitats.

Construction of stream crossings produced short term sediment pulses. Fish and other aquatic organisms downstream of construction sites can be temporary affected. Reductions in LWD could occur if a road parallels a stream or wetland or where the road crosses these habitat types. Fish passage can be impeded at stream crossing when a culvert is installed improperly such as the gradient is too steep, the culvert is too small increasing water velocity, or outlet of the culvert is perched.

Road construction impacts can be mitigated through proper road planning, design, and location. In addition, Best Management Practices and Forest Plan standards will help to mitigate the effects of construction.

Indirect Effects – Modified Proposed Action

Timber Harvest

From USDA, Forest Service 2003c: Timber harvest can produce water yield increases in local streams. If 20-30% of the basal area is removed from a forested watershed, flow volume, peaks, and timing may change. This is due to reduced interception loss from growing trees. Flow volume and peak flows tend to increase, and annual peak flows can be moved ahead several weeks.

Changes to natural streamflow regimes as a result of modifications to forest cover could alter stream channel morphology. Bankfull discharges have been found to mobilize and transport the majority of annual sediment loads over a period of years. The duration of bankfull discharge increase after timber harvest. Forest canopy changes can alter flow and sediment transport characteristics, which in turn can cause channel morphological changes.

The basal area removed from a forested watershed is also referred to as Equivalent Clearcut Area (ECA), which can be modeled. Although the model has many limitations, it provides an index of vegetative disturbance that can be used to compare the existing condition of different watersheds, and the potential impacts among land management alternatives (Ager A.A. and Clifton C. 2005). ECA provides a broad scale indicator of the potential for change in water yields and peak streamflow, especially when used with other watershed health indicators (Ager A.A. and Clifton C. 2005).

Sixth-level watershed existing ECAs within the project area range from 1 to 20 percent. As literature suggestions, watersheds approaching 25% may begin to experience increases in water yield (Troendle et al. 1998). Troendle (1994 and 1998) demonstrated that increase in water yield (increased stream flow and duration) due to timber harvest can alter channel morphology (increased channel bank or bed scour).

The watershed classification assessment conducted in 2011 identified several watersheds that had an “Impaired” rating for “Channel Shape and Function”. The justification for the rating was based on historic tie drives and/or water augmentation. The majority (22 of 35) of the sixth-level watersheds in the Snowy Range received this rating. Eight out of the 33 watersheds in the Sierra Madre Range are “Impaired” for “Channel Shape and Function”.

Watersheds with existing high ECAs, greater than 15%, may be limited to the amount and type of harvest. Accounting Units which contain existing high ECAs include:

- Bow Kettle (East Fk. Medicine Bow River watershed, 19%)
- Big Blackhall (Spring Creek. – Big Creek watershed, 20%; North Fork Big Creek watershed, 18%)
- Rock Morgan (Wagonhound Creek. – Medicine Bow River watershed, 17%)

ECAs would be monitored and if ECA values approach 25%, additional field assessments (stream surveys) will be conducted. Assessments may lead to development of more rigorous design features or a need to avoid treatments in certain areas. Impacts to channel shape and function should be minimal to non-existent based on field assessments.

While streams with defined channels would have protective vegetative buffers, small ephemeral draws and drainages could be impacted by harvest activities. In addition, landings and skid trails can compact soil layers, increasing soil erosion rates.

Sediment filtering ability and reductions in litter material could increase erosion rates and impact microhabitats favored by amphibians. Large reductions in large woody debris to stream channels is not expected with implementation of the project, since protective buffers that limits activities within the water influence zone (WIZ) will be established. An exception however may be within the wildland urban interface (WUI). Any treatments within the WIZ of the WUI will have specific design criteria established to maintain or improve the long-term health of the riparian area.

Other Vegetation Treatments

Prescribe fire units are generally located away from riparian areas, so indirect effects (increases in erosion, sediment transport and deposition, turbidity, macroinvertebrate food web shifts) would be minor and impacts would be dependent on the extent, intensity and duration of fire and its proximity to aquatic habitats.

Prescribed burns generally occur in the spring and burn in mosaic patterns. In the Rocky Mountains, high-erosion rates usually are associated with snowmelt runoff or intense mid-summer rainstorms (Minshall 2003). Spring burns would allow burned areas to revegetate before summer thunderstorms or the next season's snowmelt, so impacts to aquatic habitats or fish populations from shrub treatments would be minimal, localized, and generally of short duration.

Conifer treatments would be of moderate intensity burns. Most of the conifer treatments would not be ignited in riparian/wetland areas and the intensity of the burns are expected to decrease if fire enters riparian/wetland areas. Localized areas of bare soil could occur in any burn unit, which could increase erosion rates. Stream shading could be reduced if stream cover is lost. Reductions in large woody debris are not expected if fire moves into riparian areas. The relatively small scale of the conifer treatments would result in minimal, localized, and relatively short duration impacts to fish or amphibians and are not expected to adversely impact fish or amphibians at the population scale.

Hand thinning will not have an indirect effect to amphibians, fish or their habitats. Thinning may be conducted within the WIZ, but ground disturbance is minimal because no machinery will be used. Trees will be selectively thinned while other trees will remain standing. The remaining trees will provide shade to the streams and serve as a source of LWD recruitment in the future. Specific design criteria will be developed to maintain or improve the long term health of the riparian area.

Mastication would not have an indirect effect to fish, amphibians or their habitats. Mastication would not occur in wetlands. This activity most likely will not be used in the WIZ, except for maybe within the WUI. If this treatment is within the WIZ, specific design criteria will be developed to maintain or improve the long term health of the riparian area.

Temporary Road Construction

Ground disturbance and loss of protective ground cover from road construction used to access harvest units could increase soil erosion rates, potentially affecting aquatic habitats. Eaglin (1993) showed that roads which crossed streams greatly influenced the amount of fine substrates and embeddedness in streams. Elevated levels of sediment can reduce the biological productivity of aquatic systems by potentially decreasing plant growth (primary productivity) that may have consequences to secondary productivity (organisms that feed on the plant material) which are, in turn, fed upon by other organisms such as fish. Additionally, sediment can negatively affect fish and amphibian egg development and survival by reducing oxygen exchange to developing eggs.

The 2011 Watershed Condition Classification assessed "Open Road Density", "Proximity to Water" (roads), and "Mass Wasting" attributes for sixth-level watersheds. Within the LaVA project area, 20 watersheds had an "Impaired" condition for "Open Road Density"; 30 watersheds had an "Impaired" condition for "Proximity to Water"; and most if not all watersheds had a "Properly Functioning" condition for "Mass Wasting". Of these watersheds, 12 watersheds had both "Impaired" conditions for "Open Road Density" and "Proximity to Water". See Appendix A.

Accounting Units which have 50 % or greater of watersheds with “Impaired” conditions for “Open Road Density” and “Proximity to Water”, and a High risk potential for impacts to the aquatic environment include: Big Blackhall, Cedar Brush, Fox Wood, Green Hog and West French. See Figure 10 below for a map of Accounting Units with impaired conditions.

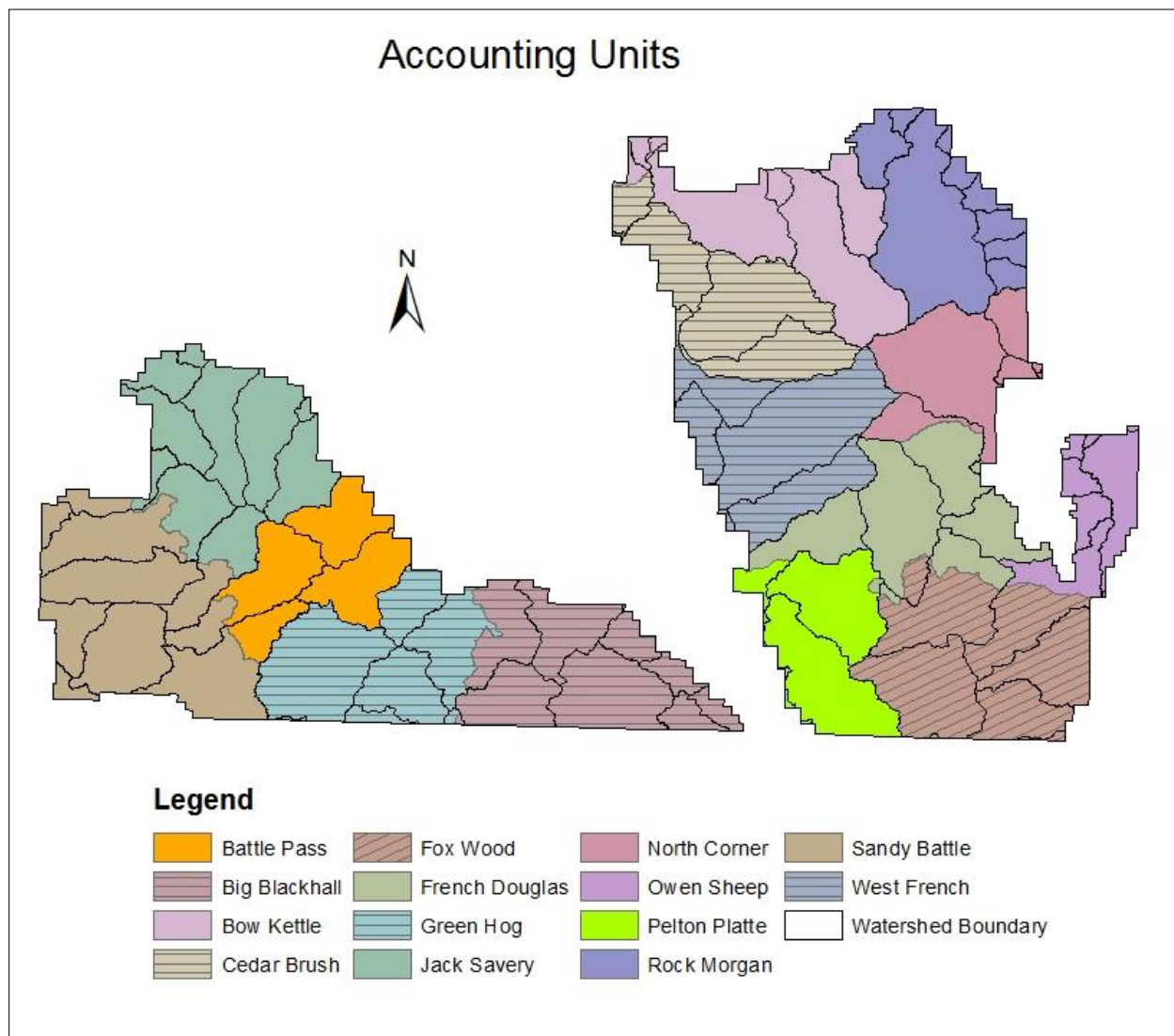


Figure 10. Accounting Units with Impaired conditions for Open Road Density and Proximity to Water.

In the short-term, “Open Road Density” and “Proximity to Water” will increase from the existing condition, due to the development of temporary roads within the watersheds. However, once the roads are decommissioned, the indicators of “Open Road Density” and “Proximity to Water” should return to the existing condition prior to the temporary road construction.

Road construction impacts can be mitigated through proper road planning, design, and location. In addition, Best Management Practices and Forest Plan standards will help mitigate the effects of construction.

Cumulative Effects – Modified Proposed Action

Under the modified proposed action alternative, fish and amphibian populations and habitats within the project area could be impacted. Sedimentation to stream channels could increase as a result of timber harvest and road construction. If proposed activities exceed the 25% threshold within sixth-level watersheds for basal area removal or ECA, there may be impacts to stream channel morphology (shape and function). These impacts may be reduced if additional field assessments (stream surveys) lead to more rigorous design features or avoidance of treatments in certain areas. While large increases in sedimentation are not expected due to implementation of design criteria and Best Management Practices, slight increases in sedimentation could cumulatively increase habitat degradation in a few stream reaches where sedimentation and habitat degradation is already an issue.

Other factors (mining, grazing, water augmentation, fish introduction, etc.) that have contributed to impaired watershed ratings are not expected to increase or decrease substantially with implementation of the proposed action.

COMPLIANCE WITH REGULATORY DIRECTION

Forest Plan Consistency

The proposed alternative can be implemented to be consistent with aquatic resource direction in the Forest Plan. The Forest Plan standards and guidelines, and design features are recommended to be included in the decision, carried forward into the implementation, and are appropriate. A Forest Plan amendment would not be required to ensure project consistency with existing 2003 Revised Forest Plan direction for management of aquatic resources.

Consistency with Other Laws and Regulations

The Endangered Species Act: The proposed action alternative meets the intent and is consistent with the Endangered Species Act.

The National Forest Management Act: The proposed action alternative is expected to be consistent with the National Forest Management Act by protecting habitat of listed sensitive species in the project area from adverse modification or destruction, as well as protect individual organisms from harm or harassment.

Irreversible and Irretrievable Commitments of Resources

There are no irreversible or irretrievable commitments of fisheries resources or aquatic habitats under the proposed action alternative.

BIOLOGICAL ASSESSMENT

Introduction

The purpose of the biological assessment (BA) is to identify possible effects the proposed action could have on threatened (T), endangered (E), proposed (P) or candidate (C) fish species in the analysis area. The effects of the modified proposed action on fish and amphibian populations and their aquatic habitats can be found in the Affected Environment and Environmental Consequences sections of this document.

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve endangered and threatened species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their critical habitats. A Biological Assessment must be prepared for federal actions that are “major construction activities” (defined under NEPA as a project significantly affecting the quality of the human environment) to evaluate the potential effects of the proposal on listed or proposed species. The contents of the BA are at the discretion of the federal agency, and will depend on the nature of the federal action (50 CFR 402.12(f)).

This BA covers fish and amphibian species identified by the U.S. Fish and Wildlife Service (USFWS) known to occur in the LaVA project area and/or species and habitat located downstream outside of the analysis area. Descriptions of the proposed actions, existing conditions, and effects of the modified proposed action on fish and amphibian populations and aquatic habitats can be found in the Affected Environment and Environmental Consequences sections of this document.

Consultation to Date

The Forest received a biological opinion (BO) in December 2003, from the USFWS in response to a formal consultation request on the effects of the 2003 Revised Medicine Bow National Forest Land and Resource Management Plan. The BO concurred with the Forest Service finding that implementation of this Forest Plan would have **beneficial effect** or **no effect** on listed Threatened and Endangered species under the Endangered Species Act.

On February 16, 2018, a list of threatened, endangered, and proposed species that may be present in the analysis area or downstream of the analysis area was received from the USFWS (USDI Fish and Wildlife Service 2018). Table 1 identifies federally listed endangered fish and amphibian species that may occur within the proposed project area and/or may be affected by the proposed project. The table includes rationale for disapproval of analysis for the listed species.

Table 1. Listed Fish and Amphibian Species that May Be Affected by the LaVA Project.

Species	Status	Species Known or Suspected to Occur or Suitable Habitat in Analysis Area	Excluded From Further Analysis
Pallid Sturgeon (<i>Scaphirhynchus albus</i>)	Endangered	No, this species has not been documented within the project area. The proposed action does not involve water depletions to the Platte River Basin .	Yes
Bonytail Chub (<i>Gila elegans</i>)	Endangered	No, this species has not been documented within the project area. The proposed action does not involve water depletions to the Colorado River Basin .	Yes
Colorado Pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered	No, this species has not been documented within the project area. The proposed action does not involve water depletions to the Colorado River Basin .	Yes
Humpback Chub (<i>Gila cypha</i>)	Endangered	No, this species has not been documented within the project area. The proposed action does not involve water depletions to the Colorado River Basin .	Yes
Razorback Sucker (<i>Xyrauchen texanus</i>)	Endangered	No, this species has not been documented within the project area. The proposed action does not involve water depletions to the Colorado River Basin .	Yes
Wyoming Toad (<i>Bufo hemiophrys baxteri</i>)	Endangered	No, this species has not been documented within the project area. No suitable habitat occurs on the Forest. Although the Forest is adjacent to the Laramie basin and provides water to the basin via the Laramie River, there is no evidence that Forest activities are implicated in the Wyoming toad's decline (USDA Forest Service 2003b).	Yes

Effects to Federally Listed and Proposed Fish and Amphibian Species

There are no federally listed fish or amphibian species within the analysis area and there will be no water depletions to the Platte River or Colorado River with implementation of this project. Additionally, there is no suitable habitat in the project area for currently listed threatened, endangered, proposed or candidate fish or amphibian species. There would be ***no direct, indirect, or cumulative effects*** associated with implementation of the modified proposed alternative under the LaVA EIS for federally listed fish and amphibian habitats within or downstream of the analysis area.

Responsibility for a Revised Biological Assessment

This Biological Assessment was prepared based on the best available information. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact endangered, threatened, or proposed species that in a manner or to an extent not previously considered, a new or revised Biological Assessment will be required.

BIOLOGICAL EVALUATION

Introduction

The purpose of this biological evaluation (BE) is to identify possible effects the modified proposed action could have on sensitive fish or amphibian species known or suspected to occur in the analysis area. Sensitive fish and amphibian species not known or suspected to occur in the area have been dismissed from detailed consideration. Descriptions of the proposed actions, existing conditions, and effects of the modified proposed action on fish populations and aquatic habitats can be found in Affected Environment and Environmental Consequences sections of this document.

Sensitive species are those animals, designated by the Regional Forester, whose current populations and/or associated habitats are reduced or restricted or their habitats and/or populations are considered vulnerable to various management activities, and special emphasis is needed to ensure they do not move towards threatened or endangered species listing.

The Rocky Mountain Region, Threatened, Endangered, Proposed and Sensitive Species Lists was consulted to determine those species that may occur within the LaVA project area (USDA Forest Service 2018). Table 2 identifies those sensitive species that were carried forward for analysis for the LaVA project.

Table 2. Forest Service Region 2 Sensitive Species.

Species	Sensitive Species Carried Forward for Analysis
Boreal toad (<i>Anaxyrus boreas boreas</i>)	Yes: Known breeding sites within the project area.
Northern leopard frog (<i>Lithobates pipiens</i>)	Yes: Occurrence documented within the project area.
Wood frog (<i>Lithobates sylvatica</i>)	Yes: Occurrence documented within the project area.
Colorado River cutthroat trout (<i>Oncorhynchus clarki plueriticus</i>)	Yes: Conservation populations within the project area.
Mountain sucker (<i>Catostomus platyrhynchus</i>)	Yes: Occurrence documented within the project area.
Bullhead sucker (<i>Catostomus discobulus</i>)	No: Species and suitable habitat is limited to portions of the Little Snake River downstream from the project area.
Flannelmouth sucker (<i>Catostomus latipinnus</i>)	No: Species and suitable habitat is limited to portions of the Little Snake River downstream from the project area.
Lake chub (<i>Couesius plumbeus</i>)	No: Species native to streams on the Thunder Basin National Grasslands.
Roundtail chub (<i>Gila robusta</i>)	No: Species and suitable habitat is limited to portions of the Little Snake River downstream from the project area.
Plains minnow (<i>Hybognathus placitus</i>)	No: Species native to streams on the Thunder Basin National Grasslands.
Sturgeon chub (<i>Macrhybopsis gelida</i>)	No: Species documented in the Cheyenne River drainage on the Thunder Basin National Grasslands.
Pearl dace (<i>Margariscus margarita</i>)	No: Species expected to occur on the Thunder Basin National Grasslands.
Hornyhead chub (<i>Nocomis biguttatus</i>)	No: Species native to and distributed in the Laramie River Basin; collection locations in the Laramie and North Laramie rivers were reported within several miles outside of the LaVA project area boundary.
Yellowstone cutthroat trout (<i>Oncorhynchus clarki plueriticus</i>)	No: Species native to and distributed in the Columbia and Snake River (NE Wyoming) basins.
Finescale dace (<i>Phoxinus neogaeus</i>)	No: Species not documented on the Medicine Bow Forest.
Flathead chub (<i>Platygobio gracilis</i>)	No: Species documented in the North Platte River near Douglas WY.

Responsibility for a Revised Biological Evaluation

This Biological Evaluation was prepared based on the best available science. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact or sensitive species that in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be written.

Sensitive Species Information

Boreal Toad

The range of the boreal toad extends from southern Alaska down to northern California, and east through Idaho, western Montana, western and south-central Wyoming, Nevada, Utah, and portions of Colorado. The boreal toad was once widely distributed in Region 2 from the mountains of southeastern Wyoming through the Rocky Mountains in Colorado to the San Juan Range in northern New Mexico. Although boreal toads were historically present in the Medicine Bow, Sierra Madre, and Laramie ranges in Wyoming, they are currently found in only a few isolated areas on the Medicine Bow Forest (Keinath 2005).

From USDA 2003b: *For approximately the past fifteen to twenty years, the Southern Rocky Mountain population (SRMP) of the boreal toad has been in precipitous decline in Wyoming (Live and Loeffler 2003). Accordingly, in 1999, the SRMP was petitioned for listing under the Endangered Species Act. After reviewing the petition, USFWS determined that the species was warranted for listing but precluded because of priorities of other listings; the boreal toad is categorized as a "Candidate Species".*

On October 5, 2017, the U.S. Fish and Wildlife Service determined that the eastern population of the boreal toad, which includes the Southern Rocky Mountain population, was not warranted for listing under the ESA (USDI 2017a).

Boreal toads in Region 2 generally occur at elevations between 7,500 and 12,000 feet. Boreal toads occupy three distinct types of habitats during the course of a year: 1) breeding ponds, 2) summer range, and 3) over-winter hibernacula. In the early summer, breeding adult boreal toads are found in or near water, and as the season progresses they may use more terrestrial habitats. Breeding habitats typically include shallow water (<20 cm) at the edges of ponds, lakes, streams, and wetlands. There are 3 known breeding sites located in the Snowy Mountains of the Medicine Bow Range within the LaVA project area. There are no known active breeding sites located in the Sierra Madre Range.

Terrestrial habitats occupied by boreal toads in the summer after breeding include a diversity of forested and non-forested wet and dry areas. Research indicates that slope is not a deterrent to boreal toad movements in upland habitats, and that toads frequently occupy terrestrial habitats outside the relatively flat wetland areas, which previously were thought to be their primary terrestrial habitat (Keinath 2005). Toads will occupy underground burrows, willows, woody debris, and breaks in the shrub or tree canopy layers that allowed sunlight to reach the ground.

In early fall, adults and young of the year migrate to terrestrial hibernacula, which are typically burrows made by other animals. Boreal toads also commonly over-winter beneath debris piles, such as rockslides, deadfall timber and rodent burrows. They will also use slash piles and beaver lodges/dams (Keinath 2005). Boreal toads do not hibernate in the water like spotted frogs (*Rana luteiventris*) or leopard frogs (*Rana pipiens*), nor are they able to tolerate freezing as do boreal chorus frogs (*Pseudacris triseriata maculata*) and wood frogs (*Rana sylvatica*). The boreal toad will travel over a mile to reach terrestrial hibernacula sites.

Scientists believe the chytrid fungus *Batrachochytrium dendrobatidis* (Bd) to be a contributing factor in boreal toad declines since the 1970s and currently see it as the primary threat to boreal toad populations throughout the Southern Rocky Mountains (Keinath 2005). Boreal toads in the SRMP, including the Snowy Range, appear to be more susceptible to the Bd fungus as compared to other sub-populations within the eastern population of the boreal toad (USDI Fish and Wildlife Service 2017b).

Northern Leopard Frog

From USDA Forest Service 2003b: *Northern leopard frogs are common throughout Canada and the northern U.S., extending south along the Rockies into Wyoming and Colorado. However, the species is declining portions of their historical range and some populations have disappeared. In Montana, many northern leopard frog populations disappeared during the 1970's and 1980's.*

Northern leopard frogs are present on the Medicine Bow Range but numbers are low and declining. The species has been found in beaver ponds and wetlands in the Sherman Mountains, Foxpark, and Lake Owen. The population in the Laramie Basin has declined since the 1970's. This species appears to be widespread but less common in the Sierra Madre, Medicine Bow Mountains, and Laramie Range. Most sightings of northern leopard frog in the Forest (montane habitats) have occurred during surveys for other amphibian surveys or during planning for proposed land management activities. There are insufficient available data to describe population dynamics or to predict species persistence in the Forest.

The northern leopard frog is typically found in foothill and montane habitats to about 9,000 feet elevation in Wyoming (Baxter and Stone 1985). Northern leopard frogs breed in small ponds and marshes that have abundant wetland and riparian vegetation. In the MBNF, breeding and rearing habitats are often beaver ponds that have emergent vegetation along well-developed shorelines. Often, the northern leopard frog can be found along the edges of marshes and wetlands associated with lakes and reservoirs. Sometimes, northern leopard frogs are found in wet meadows. Northern leopard frogs hibernate in mud at the bottom of ponds and emerge in late spring.

Studies of young northern leopard frogs in southern Alberta found that the frogs dispersed up and down streams and across land; some were found at ponds as far as 2.5 miles from source ponds, with no aquatic connections between the two. On average, however, they dispersed twice as far up and down streams as across land (Smith 2007).

Wood Frog

From USDA Forest Service 2003b: *Wood frogs distribution is patchy in Canada and in the northern U.S. In Region 2 (U.S. Forest Service), a single isolated population is restricted to montane and subalpine habitats in Medicine Bow Mountains (WY) and northern Colorado (in the vicinity of North Park CO).*

An isolated, glacial relict wood frog population occupies a relatively small area of the MBNF. This population may have declined in the 1970's but, presently, seems to be increasing; perhaps these population fluctuations are somehow related to the decline of the boreal toad (G.Beauvais, pers. comm.). Wood frogs appear to be common on some parts of the Medicine Bow Mountains, though they are less common in other areas. The Medicine Bow Mountains have robust population densities of wood frogs, and certain areas appear to be especially productive for this species: Stillwater Park, Long Lake, and Fox Park. While available data about wood frog distribution in the Medicine Bow Mountains are good, there are insufficient data to fully describe population dynamics or population persistence.

Wood frogs utilize a broad range of aquatic and moist habitats. Breeding ponds may be permanent, semi-permanent, or temporary. Non-breeding habitat is consistently moist and humidity has been shown to be important to wood frog microhabitat selection (Muths et al 2005). In the Rocky Mountains, wood frogs are more commonly associated with sedge wetlands with adjoining grassy meadows, willow bogs, coniferous forests, and aspen groves.

In early spring, adult wood frogs congregate at breeding ponds, and they remain in or around the pool until breeding is completed. Beginning in late spring or early summer, adults disperse from breeding sites into surrounding moist habitats such as sedge and grass meadows, willow bogs, and damp woodlands.

In the Rocky Mountains, adults and young-of-the-year become inactive in September and seek appropriate refugia for hibernation (Muths et al 2005). Hibernacula sites are always shallow depressions that may be under dead vegetation, leaves, grasses, rocks, or logs. Wood frogs will travel up to 0.25 miles to non-breeding sites (Muths et al 2005). The wood frog is a freeze-tolerant species.

Threats to Amphibians

Threats to amphibians include disease, habitat fragmentation (roads, timber harvest, and drought), grazing, and fire. The chytrid fungus *Batrachochytrium dendrobatidis* (BD), has been linked to amphibian population declines throughout the world (Keinath 2005). Chytrid fungus has been found in amphibian populations within the Forest.

Habitat fragmentation can occur due to timber harvest and roads. Boreal toads may be vulnerable to impacts of timber harvest when harvest activities occur within their dispersal range from breeding sites, and during the late summer when adults migrate into upland forested habitats (Keinath 2005). Disturbance of stream habitat from sedimentation is one of the greatest impacts of timber harvest on amphibian species (Keinath 2005). Timber harvest activities typically include the development and maintenance of roads, which may further increase erosion and sedimentation in adjacent streams and wetlands. Roads eliminate or alter amphibian migration and dispersal corridors, but also directly through amphibian mortality or simply by damaging habitat (Smith 2007).

Drought can also led to habitat fragmentation by eliminating amphibian habitat. Drought has dried many ephemeral ponds in the Rocky Mountains over several years, which has likely led to the extinction of some local amphibian populations (Muths et al 2005).

Fire can cause an increase sedimentation to streams and wetlands from post-fire erosion. Fire may also remove vegetation and structures that provide microhabitats that amphibians use for thermoregulation. Amphibians can travel great distances (>1 mile) when migrating from breeding ponds to winter hibernacula (Keinath 2005). Due to their slow locomotion, amphibians have a relatively low ability to escape fire, especially in a forest environment; therefore they face high rates of mortality during fires.

Livestock grazing in wetlands can cause mortality for amphibians from trampling and microhabitat disturbance. Livestock can impact wetland and riparian vegetation that amphibians use for cover to the point that it the vegetation no longer provides moist microhabitats (Keinath 2005).

Climate Change

It is difficult to predict how amphibians will respond to climate change due the uncertainty tied to all climate change models, predictions vary considerably with geographic locations, and amphibians are an extremely diverse taxon (Olson 2013). For example, climate change could influence boreal toad resilience to the chytrid fungus, both positively and negatively, but there is uncertainty about the trajectory and severity of the possible effects (USDI Fish and Wildlife Service 2017b). The Fish and Wildlife Service determined that there is no evidence that predicted changes in climate will result in significant range-wide environmental variations that are likely to significantly affect the Eastern Population of the boreal toad at the population-wide level (USDI Fish and Wildlife Service 2017). This determination includes populations on the Forest.

The restricted range of the Forest's wood frog population and its separation by hundreds of miles from other wood frog populations, puts the Forest's population at risk from extreme natural events or disease (USDA Forest Service 2003b). Wood frogs at their most southern range are more vulnerable to warmer temperatures due to climate change than frogs in the northern range (Penn State 2017).

In 2011, the Fish and Wildlife Service stated that *"Although we believe climate change will impact some northern leopard frog habitats in the future, the information we reviewed does not indicate that climate change will adversely impact northern leopard frogs at the species level"* (USDI Fish and Wildlife Service 2011). This determination refers to the western population of the northern leopard frog, which includes Wyoming.

Colorado Cutthroat Trout

From Young 2008, Status: *The Colorado River cutthroat trout (Oncorhynchus clarkii pleuriticus) was once distributed throughout the colder waters of the Colorado River basin above the Grand Canyon, primarily in Colorado, Utah, and Wyoming. Primarily a fluvial species, it is believed to have historically occupied about 34,500 km (~21,435 mi.) of streams, of which about 4,850 km (~3,015 mi.) are currently occupied by fish thought to be good representatives of this taxon and about 2,900 km (1,800 mi.) are occupied by unhybridized populations or those of particular ecological significance. Somewhat less than half of these populations are found in USDA Forest Service (USFS) Region 2, but all the national forests where Colorado River cutthroat trout historically occurred—Arapaho-Roosevelt, Grand Mesa-Uncompahgre-Gunnison, Medicine Bow-Routt, San Juan, and White River—still support populations. The increased awareness of the status of this subspecies and increased agency conservation efforts since the 1970's have apparently arrested the rapid loss of known populations and established new populations in some areas.*

The Colorado River cutthroat trout was first petitioned for listing as threatened or endangered under the Endangered Species Act in December 1999, but in April 2004, the U.S. Fish and Wildlife Service (USFWS) concluded that this subspecies did not warrant listing. In June 2007, the USFWS issued a 12-month finding that this subspecies still did not warrant listing under the Endangered Species Act. Regions 2 and 4 of the USFS have designated the Colorado River cutthroat trout a sensitive species; the Bureau of Land Management has accorded it a similar status; and Colorado, Utah, and Wyoming have given it special management designations. A multi-agency agreement also provides oversight for management of this subspecies.

The Colorado River cutthroat (CRCT) is native only to the Green River Basin. The species was abundant in the basin in the mid-1800s, but by the middle of the last century, the cutthroat was known to be rare and relegated to headwater streams in the Green and Little Snake River drainages (Wyoming Game and Fish Department 2010). The Little Snake River drainage is within the LaVA project area. The CRCT currently occupies approximately 30 percent of its historic habitat within the Little Snake River drainage (4 level HUC) (Hirsch et al 2013). Within the LaVA project area, CRCT are present in the following 6 level HUC watersheds: Haggerty Creek, North Fork Little Snake River, Roaring Fork of the North Fork Little Snake River, Upper Battle Creek, Big Sandstone Creek, Middle Savery Creek, Dirtyman Fork, and Upper Savery Creek. See the "Affected Environment" section of this document for delineations of watersheds. Within these watersheds there are conservation populations of CRCT (Hirsch et al 2006). Conservation populations are known or suspected to be at least 90 percent genetically pure or determined to be important for CRCT conservation (Hirsch et al 2006). Conservation populations may also support core populations. Core populations are at least 99 percent pure based on genetic testing (Hirsch et al 2006). Below is a list of watersheds and streams which support conservation populations.

Table 3. Colorado River Cutthroat Trout Population Streams.

Watershed	Streams
Haggarty Creek (31)	Haggarty, Alisha, Green and Belvidere Ditch
North Fork Little Snake River (41)	<u>West Branch N.F. Little Snake River:</u> Deadline, S.F. Deadline, Rose Bud Park, Rabbit, and Standard <u>North Fork Little Snake River:</u> George, Solomon, Rose, Harrison, Green Timber, Deadman, Third, Ted, and Rhondine.
Little Snake River Roaring Fork (42)	Little Snake River Roaring Fork
Upper Battle Creek (58)	Haskins
Big Sandstone Creek (66)	Big Sandstone, Deep, West Branch Deep, and Mill
Middle Savery Creek (67)	Hell Canyon
Dirtyman Fork (68)	Dirtyman Fork
Upper Savery Creek (69)	Hatch

Threats to Colorado River Cutthroat Trout

Threats to CRCT include brook trout, habitat fragmentation, loss of genetic variation, disease, trapping of beaver, mining, timber harvest, grazing, and climate change (Young 2008). Of these, brook trout, habitat fragmentation and climate change pose the greatest threats to the conservation of CRCT in the project area.

Brook trout

Brook trout have probably been responsible for the greatest loss of headwater populations and represent the greatest immediate threat to the persistence of remaining populations of CRCT (Young 2008). Brook trout compete with CRCT for habitat, forage, and also prey on young CRCT. In most of Colorado and Wyoming, there is little evidence for substantial biotic resistance by CRCT to invasions by brook trout (Young 2008). Even in waters with relatively robust populations of CRCT (e.g. North Fork Little Snake River) brook trout have been able to successfully reproduce and spread.

Habitat fragmentation

Habitat fragmentation can be caused by manmade structures such as culverts or water diversion. These structures can isolate populations by preventing fish movement above or below the structure. Aquatic movement can also be restricted by inadequate stream flows due to water diversions. Habitat fragmentation also leads to genetic isolation between populations.

There are several water diversions, operated by the Cheyenne Board of Public Utility, located in the North Fork Little Snake River watershed. These structures inhibit movement of CRCT, and entrainment in the structures even at low counts could have deleterious effects on the population (Luginbill 2010). Isolated populations above instream structures can reduce the fitness of fish species. Inbreeding depression is the reduction in fitness of offspring produced by breeding among relatives and it is inevitable in small, isolated populations (Young 2008). A genetic study by Van Horne (2011) found that none of current CRCT populations that she studied in the North Fork Little Snake River watershed meet the standards for long term persistence.

Climate change

Williams et al (2009) examined how increased summer temperatures, uncharacteristic winter flooding, and increased wildfires associated with climate change are likely to affect broad-scale population persistence of cutthroat trout. Their results suggest that 29% of the currently occupied CRCT habitat will be at high risk from one or more of these three factors. However, the CRCT populations within the LaVA project area appear to be at low to moderate risk for increased summer temperatures, drought, wildfire and winter flooding (Hirsch et al 2013).

Mountain Sucker

Mountain sucker occur throughout large portions of the western United States and Canada and is most common in the center of its range in the Intermountain region of the United States. Among the five states in Region 2 of the U.S. Forest Service, the distribution of mountain sucker is most widespread in Wyoming. It is found on the Medicine Bow Forest west of the Continental Divide in most drainages and is thought to be extirpated from the North Platte River drainage (USDA Forest Service 2003b.)

Mountain sucker primarily occur in small headwater streams to large rivers (Belica 2006). In Wyoming, the mountain sucker is typically found in low gradient stream reaches in meadows (Belica 2006). This is the case on the Medicine Bow Forest where mountain suckers have been sampled in the West Fork Battle Creek and lower Big Sandstone Creek; both low gradient meadow streams. Other streams are suspected of supporting mountain suckers within the LaVA project area.

Threats to Mountain Sucker

From USDA Forest Service 2003b: *Multiple-use activities that affect water quantity and quality and habitat continuity can impact mountain suckers. Water diversions and water impoundments are the most likely activities to adversely impact this species where it occurs in the Forest. Road construction and road reconstruction, to lesser extents, are likely to adversely impact mountain sucker habitats where roads are chronically contributing sediments into Forest streams that support the species.* Low flows and high water temperatures resulting from drought exacerbated by climate change is a potential threat to mountain sucker (COSEWIC 2010).

Determination of Effects

No Action Alternative

Direct and Indirect Effects

Based on current conditions and predicted impacts from ongoing multiple use management activities, ***this alternative may result in impacts to boreal toad, northern leopard frog, wood frog, mountain sucker, and Colorado River cutthroat trout individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.*** Applicable Forest Plan standards and project-specific design criteria will continue to be developed for individual NEPA projects. The standards and criteria will reduce impacts to riparian and wetland areas where sensitive species may occur.

Modified Proposed Action Alternative

Direct and Indirect Effects

There are only four known boreal toad breeding sites within the project area. Activities adjacent to amphibian-breeding habitats – both occupied and unoccupied and associated hibernacula, particularly for boreal toads, have the greatest risk to boreal toad populations within the planning unit of the Medicine Bow Forest.

Based on analysis of current conditions and predicted impacts resulting from ***selection of the modified proposed action alternative, this alternative may result in impacts to boreal toad, northern leopard frog, wood frog, mountain sucker, and Colorado River cutthroat trout individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.*** Applicable Forest Plan standards and project-specific design criteria have been developed to reduce impacts to riparian and wetland areas where these R2 sensitive species may occur.

MANAGEMENT INDICATOR SPECIES

Introduction

The National Forest Management Act directs National Forests to identify Management Indicator Species (MIS). MIS are chosen as species representative of certain habitat conditions important to a variety of other species. MIS are generally presumed to be sensitive to habitat changes. By monitoring and assessing MIS populations, managers can determine if management actions are affecting species populations. According the 2003 Revised Medicine Bow National Forest Land and Resource Management Plan, MIS for the Medicine Bow is the “common trout” (brook, brown and rainbow).

Brook Trout

Brook trout are native to most of eastern Canada from Newfoundland to the west side of Hudson Bay; Great Lakes and the Mississippi River Basins into Minnesota and south into the Appalachian Mountains. Brook trout are now the most widely introduced non-native trout species in the west. Preferred habitat is clear, cool, well-oxygenated creeks, small to medium rivers and lakes. The brook trout is highly adaptable to disturbance, and can tolerate temperatures ranging from 0 °C to 20 °C. Spawning takes place in September into October, and their usual life span is approximately four years, however in higher elevation colder climates they often do not reach reproductive maturity until they are four unless they migrate into larger bodies of water. Brook trout are ubiquitous in most of the Medicine Bow National Forest. Of the 196 sixth level watersheds on the Forest, brook trout occur in 162 watersheds. Of these, 145 watersheds are classified as having strong brook trout populations (Allison 2006).

Brown Trout

Brown trout are native to most of Europe, North Africa and west Asia. They were introduced to North America in 1883 (New York and Michigan), and are now widely stocked throughout southern Canada and much of the U.S. Most stockings have been into cool, well-oxygenated (> 5-6 mg/L dissolved oxygen) high gradient streams and cold lakes. Adult brown trout live in stream pools, while juveniles occupy smaller pools and riffles. Their optimum temperature range is 65° to 75° F (24 °C). Brown trout can survive at slightly higher temperatures than brook and rainbow trout, but otherwise have similar habitat requirements. Brown trout spawn in late autumn to early winter at temperatures from 44° to 48° F. The eggs hatch mid-winter and fry emerge from the gravel in very early spring just before ice break up. Brown trout occur in 100 of the 196 sixth level watersheds on the Medicine Bow Forest. Of these watersheds, 54 are considered to have strong populations (Allison 2006).

Rainbow Trout

These trout are native to the Pacific Slope from Kuskokwim, Russia, and Alaska to (at least) Rio Santo Domingo in Baja California. They are also in the upper Mackenzie River drainage in the Arctic basin through the endorheic basins of southern Oregon. Rainbow trout have been widely introduced into the cold waters throughout North America and the rest of the world. Their preferred habitats are the cold headwaters of creeks, small to large rivers and lakes. Rainbow trout like cutthroat trout are primarily spring spawners. They spawn between mid-April and late June in most areas at temperatures between 50° and 60° F. Eggs incubate for four to seven weeks, and then the hatched fry emerge from the gravel after another five days to two weeks. Of the 196 sixth level watersheds on the Medicine Bow Forest, 111 watersheds have rainbow trout populations. Of these, 51 are considered strong (Allison 2006).

Status of MIS “Common Trout”

The status for these common trout are displayed in the Inland West Watershed Initiative (IWWI) completed as part of a Region-wide effort (Allison 2006). The IWWI reports presence, distribution and relative population status for brook, brown, and rainbow trout by sixth-level watersheds across the Forest, and was based on existing population information gathered from state and federal agencies (Allison 2006).

Most streams across the Forest, including the LaVA analysis area, are estimated to support moderate to strong populations of brook, brown, and rainbow trout. Fluctuations in relative abundance are usually due to naturally occurring habitat quality, quantity, and annual variation in species recruitment rather than anthropogenic causes and effects. Although year-to-year variance is likely, common trout populations are relatively strong and stable. See Figures 10-15 below for status and distribution of common trout in the LaVA project area.

Summary Findings for Common Trout MIS

No Action Alternative

Direct, Indirect and Cumulative Effects

Environmental effects relative to implementation of the no-action alternative are expected to have a low degree of impact for Forest MIS species. The degree of impact is attributable to the amount of management activities distributed across the Medicine Bow Forest in watersheds which contain MIS. Any activities proposed will have individual NEPA documents with associated design criteria and BMPs identified to mitigate potential impacts to MIS.

Modified Proposed Action Alternative

Direct, Indirect and Cumulative Effects

Environmental effects relative to implementation of the action alternative are expected to have a moderate degree of impact for Forest MIS species. The degree of impact is attributable to the relative size of treatment areas or disturbance planned under the action alternative for a given watershed in conjunction with past, present, and reasonably foreseeable actions. The degree of impacts for MIS is partially dependent on the time scale at which the project is implemented; it is expected that potential impacts to Forest MIS under the action alternative would be of relatively temporary (i.e. 10-15 years) duration. Timber units adjacent to fishbearing streams would be buffered. The use of BMPs, design criteria and Forest Plan standards during the design and implementation of the project will help reduce potential impacts to Forest MIS.

Brook Trout Status & Distribution Snowy Range

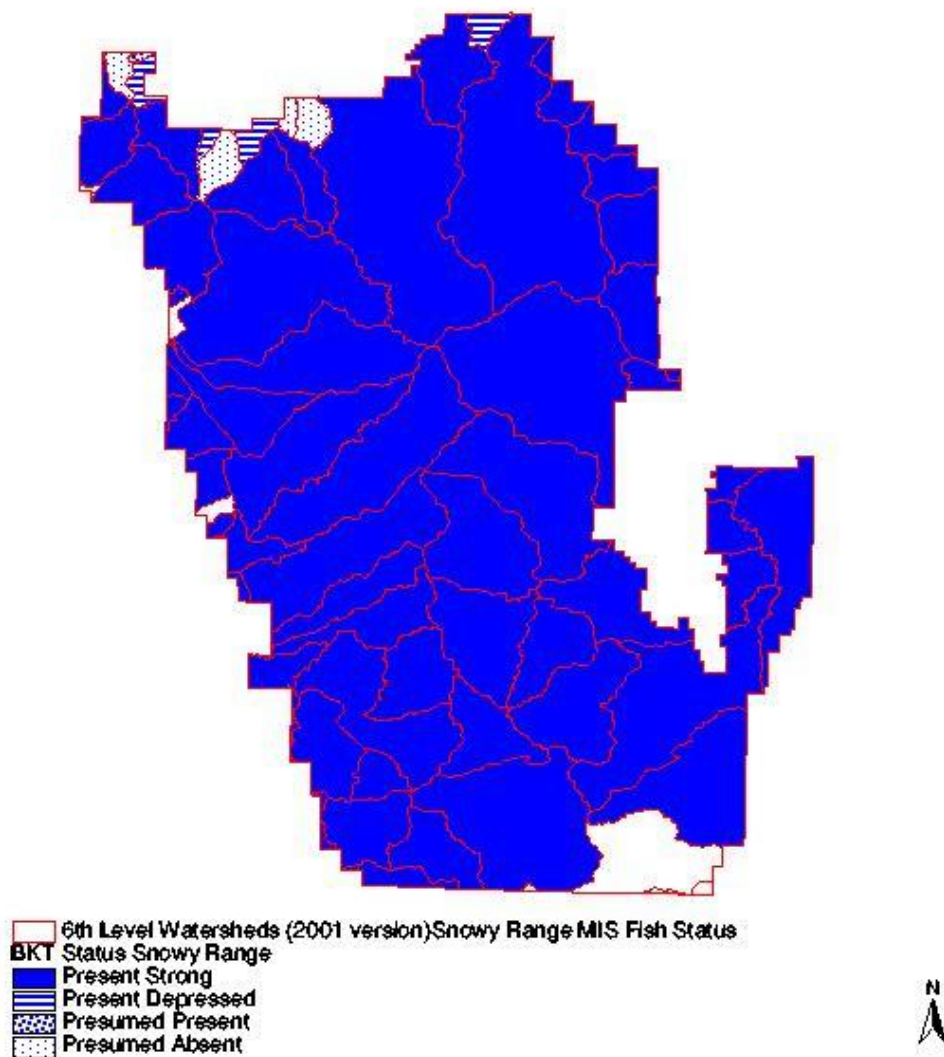
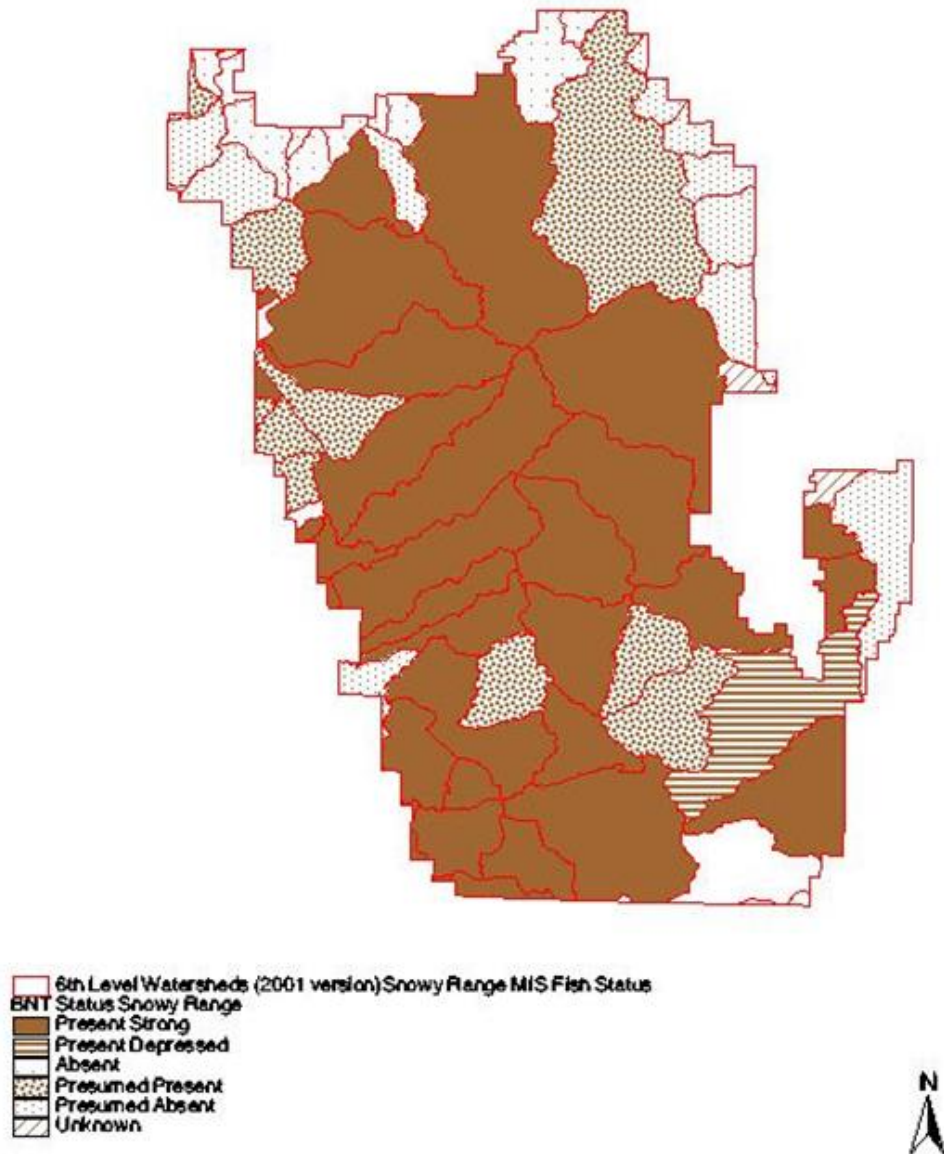


Figure 11. Brook Trout Status in the Snowy Range (Allison 2006).

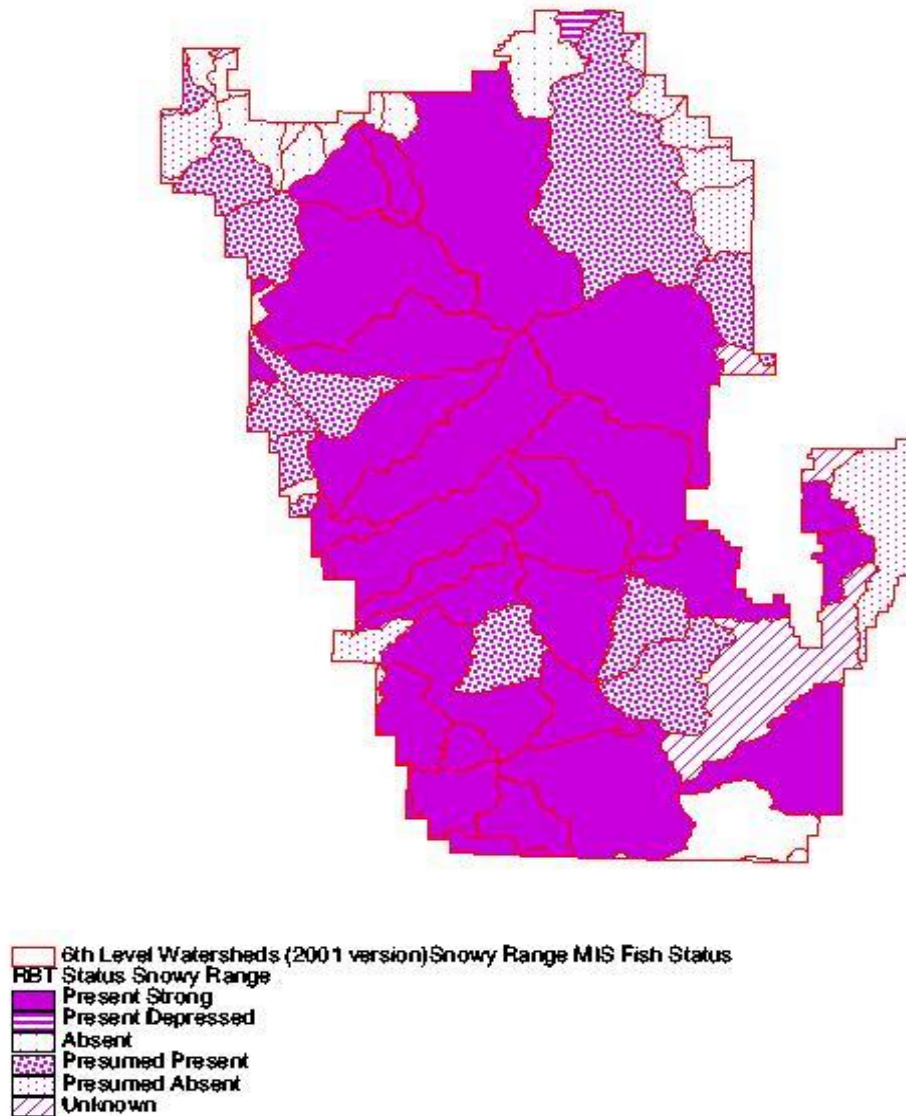
Brown Trout Status & Distribution Snowy Range



Map created by P.Guenther-Gloss, 6/14/2004
From IWWI data layers (USFS 2001)

Figure 12. Brown Trout Status in the Snowy Range (Allison 2006).

Rainbow Trout Status & Distribution Snowy Range



Map created by P.Guenther-Gloss, 6/14/2004
From IWWI data layers (USFS 2001)

Figure 13. Rainbow Trout Status in the Snowy Range (Allison 2006).

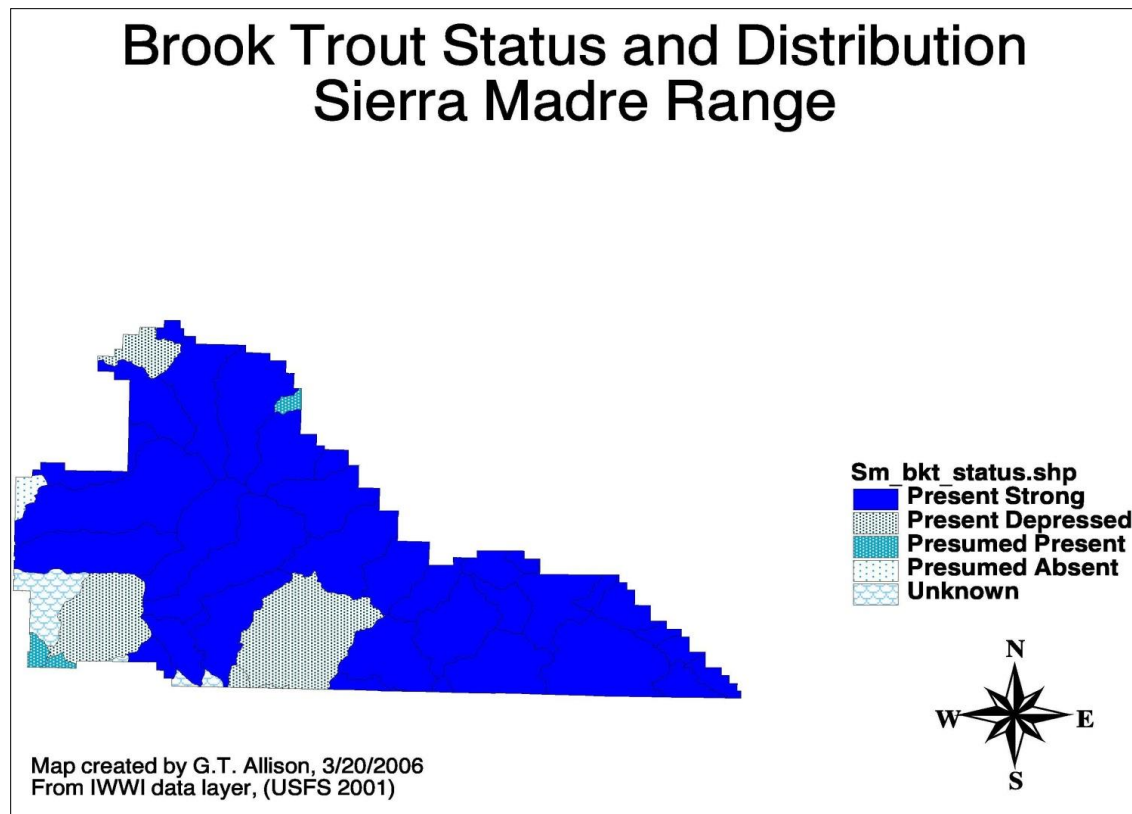


Figure 14. Brook Trout Status in the Sierra Madre Range (Anderson 2011).

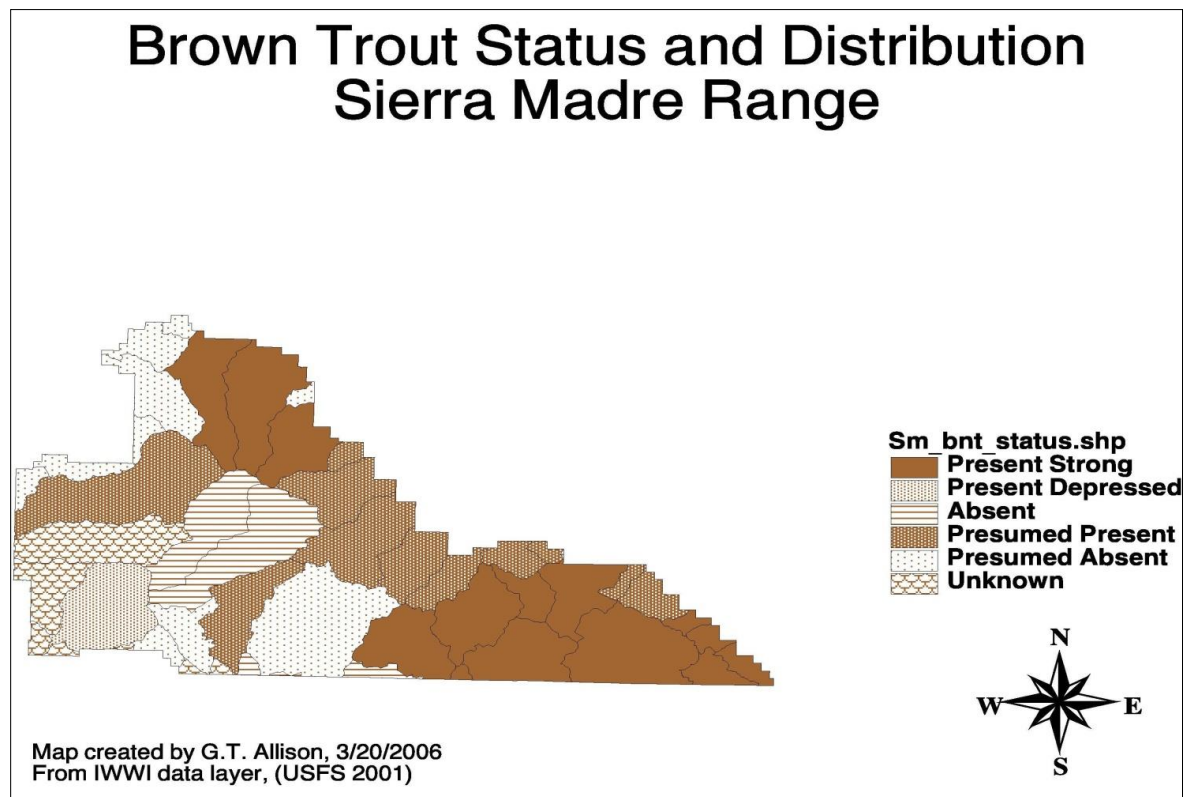


Figure 15. Brown Trout Status in the Sierra Madre Range (Anderson 2011).

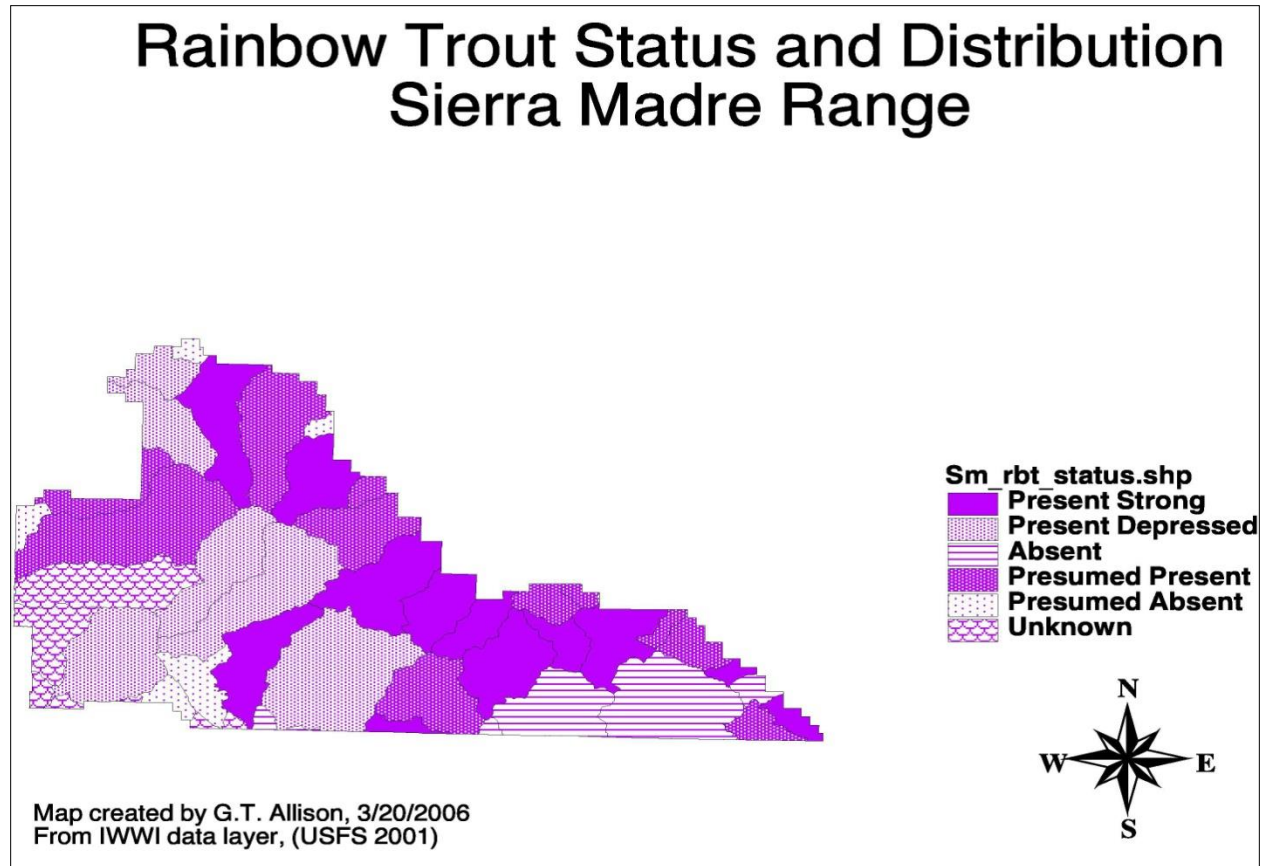


Figure 16. Rainbow Trout Status in the Sierra Madre Range (Anderson 2011).

REFERENCES

- Ager, A.A. and Clifton, C. 2005.** Software for calculating vegetation disturbance and recovery by using equivalent clearcut area model. USDA-FS Pacific Northwest Research Station, General Technical Report, PNW-GTR-637. https://www.fs.fed.us/pnw/pubs/pnw_gtr637.pdf. (28 November 2018).
- Allison, T.G. 2006.** Snowy range travel management analysis for the Laramie Ranger District. Fisheries and aquatic habitat resources report. Unpublished report. On file with Brush Creek – Hayden Ranger District.
- Anderson, A. 2010.** Culvert assessment at road/stream crossings for Medicine Bow and Routt National Forests and Thunder Basin Grassland, final report. Unpublished report. On file with: Medicine Bow – Routt NFs, Thunder Basin National Grassland.
- Anderson, S. 2011.** Savery project, environmental impact statement fisheries and aquatic habitat specialist report. Unpublished report. On file with Brush Creek – Hayden Ranger District.
- Belica, L.T. and Nibbelin, N.P. 2006.** Mountain sucker (*Catostomus platyrhynchus*) a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5206796.pdf. (21 November 2017).
- Cross, J. 2002.** Measuring the impact of harvest intensity on riparian forest functionality in terms of shade production and large woody debris recruitment potential: two models. https://www.ruraltech.org/pubs/theses/cross/index.asp#conc_shade. (7 March 2018)
- COSEWIC 2010.** Assessment and status report on the mountain sucker *Castostmus platyrhynchus*. Saskatchewan – Nelson river populations, Milk River populations, Pacific populations in Canada. http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_mountain_sucker_0911_eng.pdf. (21 November 2017).
- Eaglin, G.S. and Hubert, W.A. 1993.** Management briefs: effects of logging and roads on substrate and trout streams of the Medicine Bow National Forest, Wyoming. <https://www.tandfonline.com/doi/pdf/10.1577/1548-8675%281993%29013%3C0844%3AMBEOLA%3E2.3.CO%3B2?needAccess=true>. (7 March 2018).
- Epstein, J.K. 2017.** Value of rec fishing of national forests. jonaskepstein@fs.fed.us (13 December 2017).
- Ewers, B.E., Pendall, E., Norton, U., and Sivianpillai, R. 2015.** Decadal scale estimates of forest water yield after bark beetle epidemics in southern Wyoming. http://www.uwyo.edu/owp/_files/finalrpt41ewers.pdf. (21 February 2019).
- Hart, S.J., Schoennagel, T., Veblen, T.T., Chapman, T.B. 2015.** Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks. Proceedings of the National Academy of Science of the United States of America: 112 (14). <http://www.pnas.org/content/112/14/4375>. (23 March 2018).
- Hirsch, C.L.; Albeke, S.E.; Thomas, N.P. 2006.** Range-wide status of Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*): 2005.
- Hirsch, C.L.; Dare, M.R.; Albeke, S.E. 2013.** Range-wide Status of Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*): 2010.
- Keinath, D., McGee M. 2005.** Boreal toad (*Bufo boreas boreas*) A technical conservation assessment. USDA Forest Service, Rocky Mountain Region. <http://www.fs.fed.us/r2/projects/scp/assessments/borealtoad.pdf>. (8 November 2017).

- Kulakowski, D., Jarvis, D. 2011.** The influence of mountain pine beetle outbreaks and drought on severe wildfires in northwestern Colorado and southern Wyoming: A look at the past century. *Forest Ecology and Management*: 262(9). https://ac.els-cdn.com/S0378112711004555/1-s2.0-S0378112711004555-main.pdf?_tid=14370c1c-1dee-45a7-abc2-21f0fcf3f3f1&acdnat=1521843565_4dab1e929db4a309982a906a3f18432a. (22 March 2018).
- Luginbill, J.S. 2010.** Fish passage and entrainment of Colorado River cutthroat trout at water diversion structures in the North Fork Little Snake River drainage, Wyoming. Wyoming Game and Fish Department Fish Division, Administrative Report 2010.
- Mikkelsen, K.M., Bearup, L.A., Maxwell, R.M., et al. 2013.** Bark beetle infestation impacts on nutrient cycling, water quality and interdependent hydrological effects. *Biogeochemistry*: 115(1). <https://link.springer.com/article/10.1007/s10533-013-9875-8#citeas>. (24 March 2018).
- Minshall, G. W. 2003.** Responses of stream benthic macroinvertebrates to fire. <https://www.fs.fed.us/rm/boise/research/fisheries/fire/FAE%20Papers/MinshallFEMFinal.pdf>. (13 March 2018).
- Muths, E., S. Rittman, J. Irwin, D. Keinath, and R. Scherer. 2005.** Wood Frog (*Rana sylvatica*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. <http://www.fs.fed.us/r2/projects/scp/assessments/woodfrog.pdf>. (14 November 2017).
- Olson, D.H.; Saenz, D. 2013.** Climate change and amphibians. USDA, Forest Service, Climate Change Resource Center. www.fs.usda.gov/ccrc/topics/wildlife/amphibians/ (15 November 2017).
- Paugh, E. and Small, E. 2011.** The impact of pine beetle infestation on snow accumulations and melt in the headwaters of the Colorado River. *Ecohydrology* (5) 2012. <http://geode.colorado.edu/~small/docs/2012Ecohydrology.pdf>. (25 March 2018).
- Pilliod, D.S., Bury, R., Hyde, E.J., Pearl, C.A., and Corn, P. S. 2003.** Fire and amphibians in North America. *Forest Ecology and Management*: 178(1-3). <https://www.sciencedirect.com/science/article/pii/S0378112703000604#BIB131>. (22 March 2018).
- Penn State. 2017.** Wood frogs research clarifies risks posed to animals by warming climate. *Science Daily*. www.sciencedaily.com/releases/2017/08/170819103700.htm. (15 November 2017).
- Purchase, C. 2012.** Cheyenne Board of Public Utilities operating permit renewal water resource report. http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/64809_FSPLT2_289005.pdf. (29 September 2017).
- Rhoades, C.C., Pelz, K.A., Fornwalt, P.J., and Wolk, B.H. 2018.** Overlapping bark beetle outbreaks, salvage logging and wildfire restructure a lodgepole pine ecosystem. *Forest*:9(3). <http://www.mdpi.com/1999-4907/9/3/101/htm>. (23 March 2018).
- Schnackenberg, L., Krezelok, J., Gloss D. [et al.]. 2010.** Medicine Bow – Routt National Forests watershed condition assessment. Unpublished report. On file with: Medicine Bow – Routt NFs, Thunder Basin National Grassland.
- Smith, B.E. and D.A. Keinath. 2007.** Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. <http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf>. (14 November 2017).
- Troendle, C.A. and W.K. Olsen. 1994.** Potential effects of timber harvest and water management on streamflow dynamic and sediment transport. <https://www.srs.fs.usda.gov/pubs/37696>. (31 October 2018).

- Troendle, C.A., J.M. Wilcox, and G.S. Bevenger. 1998.** The Coon Creek water yield augmentation project: implementation of timber harvesting technology to increase streamflow.
<https://www.sciencedirect.com/science/article/pii/S0378112700005168>. (8 March 2018).
- USDA Forest Service. 2003a.** Medicine Bow National Forest Land and Resource Management Plan.
https://www.fs.usda.gov/detail/mbr/landmanagement/planning/?cid=fsbdev3_025109. (8 March 2018).
- USDA Forest Service. 2003b.** Medicine Bow National Forest, Final Environmental Impact Statement for the Revised Land and Resource Management Plan, Appendix I.
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5165737.pdf. (21 November 2017).
- USDA Forest Service. 2003c.** Medicine Bow National Forest, Final Environmental Impact Statement for the Revised Land and Resource Management Plan.
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5163471.pdf. (1 September 2017).
- USDA Forest Service. 2004.** Forest Service Manual 2500 – Watershed and Air Management, WO Amendment 2500 – 2004 – 1. <http://www.fs.fed.us/im/directives/fsm/2500/2520.doc>. (5 September 2017).
- USDA Forest Service. 2006.** Timber sale contract, division B, standard provisions for scaled timber sales.
https://www.fs.fed.us/forestmanagement/documents/contracts/!FS-2400-6_Division_B_6-06.pdf. (27 November 2017).
- USDA Forest Service. 2011a.** Watershed condition framework.
https://www.fs.fed.us/biology/resources/pubs/watershed/maps/Watershed_Condition_Framework_2011FS977.pdf. (5 September 2017).
- USDA Forest Service. 2011b.** Watershed Condition Classification Technical Guide.
https://www.fs.fed.us/biology/resources/pubs/watershed/maps/watershed_classification_guide2011FS978.pdf. (5 September 2017).
- USDA Forest Service. 2011c.** Watershed condition framework, watershed condition classification methods. Unpublished report. On file with: Medicine Bow – Routt NFs, Thunder Basin National Grassland.
- USDA Forest Service. 2014.** Water facility easement, Exhibit 2, operation and maintenance plan, city of Cheyenne, by and through its Board of Public Utilities Water Collection, Reservoir and Transmission System, BCH487. Unpublished report. On file with Medicine Bow –Routt NFs, Thunder Basin National Grassland.
- USDA Forest Service. 2017.** Spending patterns of outdoor recreation visitors to national forests.
https://www.fs.fed.us/pnw/pubs/pnw_gtr961.pdf (13 December 2017).
- USDA Forest Service. 2018.** Rocky Mountain Region – TEPS species list.
http://fsweb.r2.fs.fed.us/rr/R2_TES_Site_2007/sensitive.html#ss2 (15 March 2018).
- USDI Fish and Wildlife Service. 2011.** Endangered and threatened wildlife and plants; 12-month findings on petition to list the Northern Leopard frog in the western United States as threatened. Federal Register/Vol. 76, No. 193/Wednesday, October 5, 2011/Proposed Rules.
https://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/NorthernLeopardFrog/NLFrog_12-month_FR_10-5-11.pdf. (15 November 2017).

- USDI Fish and Wildlife Service. 2017a.** Endangered and threatened wildlife and plants; 12-month findings on petitions to list 25 species as endangered or threatened species. Federal Register/Vol. 82, No. 192/Thursday, October 5, 2017/Proposed Rules. <https://www.gpo.gov/fdsys/pkg/FR-2017-10-05/pdf/2017-21352.pdf> (8 November 2017).
- USDI Fish and Wildlife Service. 2017b.** Species status assessment report for the eastern population of the boreal toad, *Anaxyrus boreas boreas*. Western Colorado Ecological Services Field Office, Grand Junction, Colorado. [https://www.fws.gov/mountain-prairie/es/species/amphibians/borealtoad/Boreal%20toad%20SSA%20Report%20\(1\).pdf](https://www.fws.gov/mountain-prairie/es/species/amphibians/borealtoad/Boreal%20toad%20SSA%20Report%20(1).pdf) (16 October 2017).
- USDI Fish and Wildlife Service. 2018.** Threatened and endangered species list for the proposed LaVA project.
- Van Horne, R. 2011.** Genetic status of isolated populations of Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) in the North Fork Little Snake River drainage, Wyoming. All Graduate Theses and Dissertations. Paper 1347. <https://digitalcommons.usu.edu/cgi/viewcontent.cgi?referer=https://www.bing.com/&httpsredir=1&article=2354&context=etd>. (20 November 2017).
- Williams, J.E., Haak, A.L., Neville, H.M., Colyer, W.T. 2009.** Potential consequences of climate change to persistence of cutthroat trout populations. North American Journal of Fisheries Management 29:533-548. <http://afs.tandfonline.com/doi/full/10.1577/M08-072.1#.Wd6ECXIUmAZ>. (1 September 2018).
- WDEQ, Water Quality Division. 2016.** Wyoming's 2014 integrated 305(b) and 303(d) report. <http://deg.wyoming.gov/media/attachments/Water%20Quality/Water%20Quality%20Assessment/Reports/2014-Integrated-305b-and-303d-Report.pdf>. (14 March 2018).
- Wyoming Department of Game and Fish. 2017.** State Wildlife Action Plan. <https://drive.google.com/drive/folders/OB1iN5AyJdrYPa2JMMjh6Q2RseVE>. (28 August 2017).
- Wyoming Department of Game and Fish. 2010.** State Wildlife Action Plan. https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/SWAP/SWAP_2010_FULL.pdf. (28 August 2017).
- Young, M.K. 2008.** Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. <http://www.fs.fed.us/r2/projects/scp/assessments/coloradorivercutthroattrout.pdf>. (17 November 2017).
- Young, M.K; Haire, D.; Bozek, M.A. 1994.** The effects and extent of railroad tie drives in streams of southeastern Wyoming. https://www.researchgate.net/publication/233517310_The_Effect_and_Extent_of_Railroad_Tie_Drives_in_Streams_of_Southeastern_Wyoming. (30 March 2018).

APPENDIX A- ACCOUNTING UNITS

Table 4. Colorado River Cutthroat Trout Conservation Populations per Accounting Unit.

Accounting Unit	HUC 6 Watershed	Stream
Battle Pass	Little Snake River – Roaring Fork	Roaring Fork
Battle Pass	Upper Battle Creek	Haskins
Green Hog	North Fork Little Snake River	Deadline, Deadman, Green Timber, Harrison, Rabbit, Rose, Standard, Solomon, South Fork Deadline, Ted and Third
Jack Savery	Big Sandstone Creek	Big Sandstone, Deep and Mill
Jack Savery	Dirtyman Creek	Dirtyman
Jack Savery	Haggerty Creek	Alisha, Haggerty and Green
Jack Savery	Upper Savery Creek	Hatch
Sandy Battle	Big Sandstone Creek	Deep and Mill
Sandy Battle	Haggerty Creek	Belvidere Ditch and Haggerty
Sandy Battle	Little Sandstone Creek	Belvidere Ditch
Sandy Battle	Lower Savery Creek	Belvidere Ditch

Comparison of Alternative Effects on Watersheds per Accounting Unit (Table 5, begins on next page)

Effect Assumptions: Potential Risk

- High- Full suite of tools, which includes temporary road construction within the majority of the watershed.
- Moderate- Full suite of tools, which includes temporary road construction within a portion of the watershed.
- Low- Full suite of tools, which includes temporary road construction within a minority of the watershed.
- Proposed Action Effects include road decommissioning of temporary roads (15 years for project).
- Potential risk is in reference to impacting aquatic habitat due to the modified proposed action.

Progress Towards Desired Condition within the Watershed: The existing condition of all watersheds will be maintained due to:

- Only temp. roads will be constructed.
- ECAs would be monitored and used to determine when additional field stream assessment are needed to develop more rigorous design features or avoidance of treatment in certain areas.
- All perennial stream crossing will allow aquatic organism passage.
- Streamside management zones and water influence zones will be established for all treatment units. Some treatments may occur in within these zones.
- BMPs and Design Criteria will be implemented.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Battle Pass	Calf Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 6%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Majority of the watershed is available for the full suite of tools including temporary road construction.
Battle Pass	Little Snake River- Roaring Fork	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools, including temporary road construction is limited to lower 1/2 of watershed.
Battle Pass	North Fork Encampment	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools is limited to the lower 1/2 of watershed.
Battle Pass	Upper Battle Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning Properly Proximity to Water: Functioning at Risk Existing ECA: 2%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools available for about 1/4 of the watershed and no temporary roads would be constructed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Big Blackhall	Bear Creek-Big Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: <u>Impaired</u> Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools available for the majority of the watershed. No temporary roads would be constructed.
Big Blackhall	Beaver Creek-North Platte River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 7%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools available for the majority of the watershed.
Big Blackhall	Big Creek-North Platte River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools available for the majority of the watershed.
Big Blackhall	East Fork Encampment River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools limited to less than 1/2 of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Big Blackhall	Encampment River- Billie Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 6%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools limited to less than 1/2 of the watershed.
Big Blackhall	North Fork Big Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 14%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools available for over 1/2 of the watershed.
Big Blackhall	South Fork Big Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools available for the entire watershed.
Big Blackhall	Spring Creek- Big Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 20%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools is available for the entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Bow Kettle	East Fork Medicine Bow River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 20%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed.
Bow Kettle	Medicine Bow River-Turpin Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for approximately 1/3 of the watershed.
Bow Kettle	Pass Creek-Hat Creek	Existing Condition Rating No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Small watershed (~1,350 acres.); Full suite of tools identified for 1/2 of the watershed. No temporary road construction.
Bow Kettle	Pass Creek-Lee Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 10%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Bow Kettle	Pass Creek-Little Pass Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 13%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the entire watershed.
Bow Kettle	South Fork Lake Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: Functioning Properly Existing ECA: 0%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for the entire watershed. No temporary road construction.
Cedar Brush	Brush Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 11%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for majority of the watershed.
Cedar Brush	North Brush Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 11%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Cedar Brush	North Draw	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for 1/2 of the watershed.
Cedar Brush	South Brush Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
Cedar Brush	South Fork Lake Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: Functioning Properly Existing ECA: 0%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for the entire watershed. No temporary road construction.
Fox Wood	Boswell Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Fox Wood	Laramie River- Bear Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 7%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the entire watershed.
Fox Wood	Middle Douglas Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
Fox Wood	Pelton Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 8%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
Fox Wood	Squirrel Creek- Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Fox Wood	Upper Douglas Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 14%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
French Douglas	Little Laramie River- Middle Fork Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Activities are identified for 1/2 of the watershed. Limited temporary road construction.
French Douglas	Middle Douglas Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
French Douglas	North Platte River- Cottonwood Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Majority of the watershed is Wilderness.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
French Douglas	South Fork Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for about 3/4 of the watershed. Limited temporary road construction.
French Douglas	Upper Douglas Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 14%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
Green Hog	Encampment River- Billie Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 6%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools limited to less than ½ of the watershed.
Green Hog	Encampment River- West Fork	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning Properly Proximity to Water: Functioning Properly Existing ECA: 6%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for about 1/2 the watershed. Limited temporary road construction.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Green Hog	Hog Park Creek	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for 1/2 the watershed.
Green Hog	Little Snake River-Whiskey Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 8%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the entire watershed.
Green Hog	Miner Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 10%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed.
Green Hog	North Fork Little Snake River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: <u>Impaired</u> Existing ECA: 2%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for the watershed; 1/3 of the watershed is Wilderness. Limited temporary road construction.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Jack Savery	Big Sandstone Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for 1/2 of the watershed. Limited temporary road construction.
Jack Savery	Dirtyman Fork	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for the entire watershed. Limited temporary road construction.
Jack Savery	Haggerty Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 2%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for majority of the watershed. No temporary road construction identified for 1/2 of the watershed.
Jack Savery	Little Jack Creek	Existing Condition Rating No Data Existing ECA: 10%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Small watershed (~1,350 acres.); Full suite of tools identified for entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Jack Savery	Lower Spring Creek	Existing Condition Rating No Data Existing ECA: 7%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Small watershed (~650 acres.); Full suite of tools identified for entire watershed.
Jack Savery	North Fork Savery Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 11%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.
Jack Savery	South Spring Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 7%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for 2/3 of the watershed. No temporary road construction for the upper portion of the watershed.
Jack Savery	Upper Jack Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Jack Savery	Upper Savery Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed. No temporary road construction for portions of the watershed.
Jack Savery	Upper Spring Creek- North Platte River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.
North Corner	Libby Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for 1/2 of the watershed. Limited temporary road construction.
North Corner	Little Laramie River- Centennial Valley	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
North Corner	Little Laramie River- Middle Fork Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Activities identified for 1/2 of the watershed. Limited temporary road construction.
North Corner	Mill Creek- Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for majority of watershed.
Owen Sheep	Lake Hattie	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning Properly Proximity to Water: <u>Impaired</u> Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for the about 1/2 of the watershed. No temporary road construction.
Owen Sheep	Little Laramie River- Centennial Valley	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Owen Sheep	Little Laramie River- Middle Fork Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Activities are identified for 1/2 of the watershed. Limited temporary road construction.
Owen Sheep	Little Laramie River- Webb Lake	Existing Condition Rating No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Small watershed on the Forest (~620 acres.) and thus no data exists.
Owen Sheep	South Fork Little Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for about 3/4 of the watershed. Limited temporary road construction.
Owen Sheep	Squirrel Creek- Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Pelton Platte	Lower Douglas Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for 1/2 of the watershed.
Pelton Platte	North Platte River- Cottonwood Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Majority of the watershed is Wilderness.
Pelton Platte	North Platte River- Sixmile Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Majority of the watershed is in Wilderness.
Rock Morgan	Cooper Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Prescribed Fire or Hand Tools identified for majority of the watershed. No temporary road construction.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Rock Morgan	Four Mile Creek- Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.
Rock Morgan	Rock Creek- Deep Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 8%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for 1/4 of the watershed.
Rock Morgan	Seven Mile Creek- Laramie River	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: Functioning at Risk Existing ECA: No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for majority of watershed.
Rock Morgan	Three Mile Creek- Rock Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: No Data	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Rock Morgan	Upper Dutton Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning Properly Proximity to Water: Functioning Properly Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Limited suite of tools and no temporary road construction identified for the entire watershed.
Rock Morgan	Upper Foote Creek	Existing Condition Rating No Data Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the entire watershed.
Rock Morgan	Wagonhound Creek- Medicine Bow River	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 17%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools is identified for the majority of the watershed.
Sandy Butte	Big Sandstone Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for 1/2 of the watershed. Limited temporary road construction.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Sandy Butte	Dirtyman Fork	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for entire watershed. Limited temporary road construction.
Sandy Butte	Haggerty Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 2%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for majority of the watershed. No temporary road construction for 1/2 of the watershed.
Sandy Butte	Little Sandstone Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 5%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: <u>Impaired</u> Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the majority of the watershed. Limited temporary road construction.
Sandy Butte	Little Snake River- Fly Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning Properly Proximity to Water: <u>Impaired</u> Existing ECA: 0%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Limited suite of tools identified for 1/2 of the watershed. Limited temporary road construction.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Sandy Butte	Little Snake River- Roaring Fork	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 4%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools, including temporary road construction is limited to lower 1/2 of watershed.
Sandy Butte	Lower Battle Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: Functioning at Risk Proximity to Water: Functioning at Risk Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools identified for about 1/2 of the watershed.
Sandy Butte	Lower Savery	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning at Risk Large Woody Debris: Functioning Properly Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 1%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Moderate- Full suite of tools identified for 1/2 of the watershed.
Sandy Butte	Middle Savery	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning Properly Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning at Risk Open Road Density: <u>Impaired</u> Proximity to Water: Functioning at Risk Existing ECA: 13%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for the entire watershed.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
Sandy Butte	Upper Battle Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: Functioning Properly Channel Shape and Function: Functioning Properly Open Road Density: Functioning Properly Proximity to Water: Functioning at Risk Existing ECA: 2%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Full suite of tools available for about 1/4 of the watershed. No temporary road construction.
West French	Brush Creek	Existing Condition Rating Aquatic Physical Process: Functioning Properly Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning at Risk Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 11%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for majority of the watershed.
West French	French Creek- North Platte River	Existing Condition Rating Aquatic Physical Process: <u>Impaired</u> Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: <u>Impaired</u> Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 12%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.
West French	North Platte River- Cottonwood Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: Functioning at Risk Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: Functioning at Risk Proximity to Water: <u>Impaired</u> Existing ECA: 3%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	Low- Majority of the watershed is Wilderness.

Accounting Unit	HUC 6 Watershed	No Action Alternative Effects	Modified Proposed Action Alternative Effects	Potential Risk to Aquatic Habitat
West French	North Platte River- North Cottonwood Creek	Existing Condition Rating Aquatic Physical Process: Functioning at Risk Aquatic Biological Process: <u>Impaired</u> Habitat Fragmentation: Functioning Properly Large Woody Debris: <u>Impaired</u> Channel Shape and Function: <u>Impaired</u> Open Road Density: <u>Impaired</u> Proximity to Water: <u>Impaired</u> Existing ECA: 9%	Potential Condition Rating Aquatic Physical Process: Same as No Action Aquatic Biological Process: Same as No Action Habitat Fragmentation: Same as No Action Large Woody Debris: Same as No Action Channel Shape and Function: Same as No Action Open Road Density: Same as No Action Proximity to Water: Same as No Action Predicted ECA After Proposed Action: 25%	High- Full suite of tools identified for a majority of the watershed.